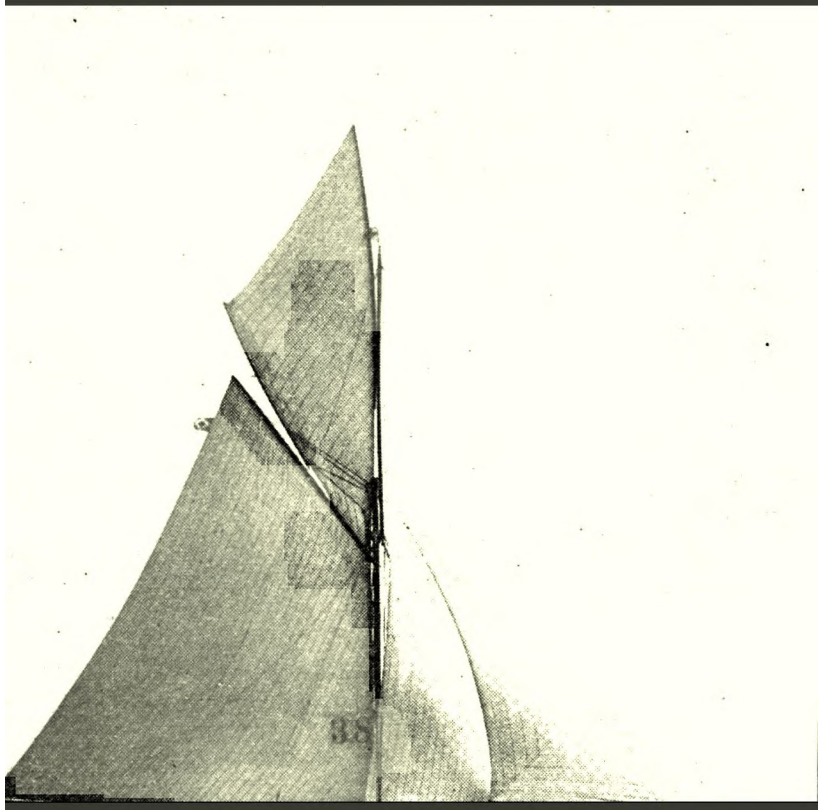

On yachts and yacht handling

Thomas Fleming Day

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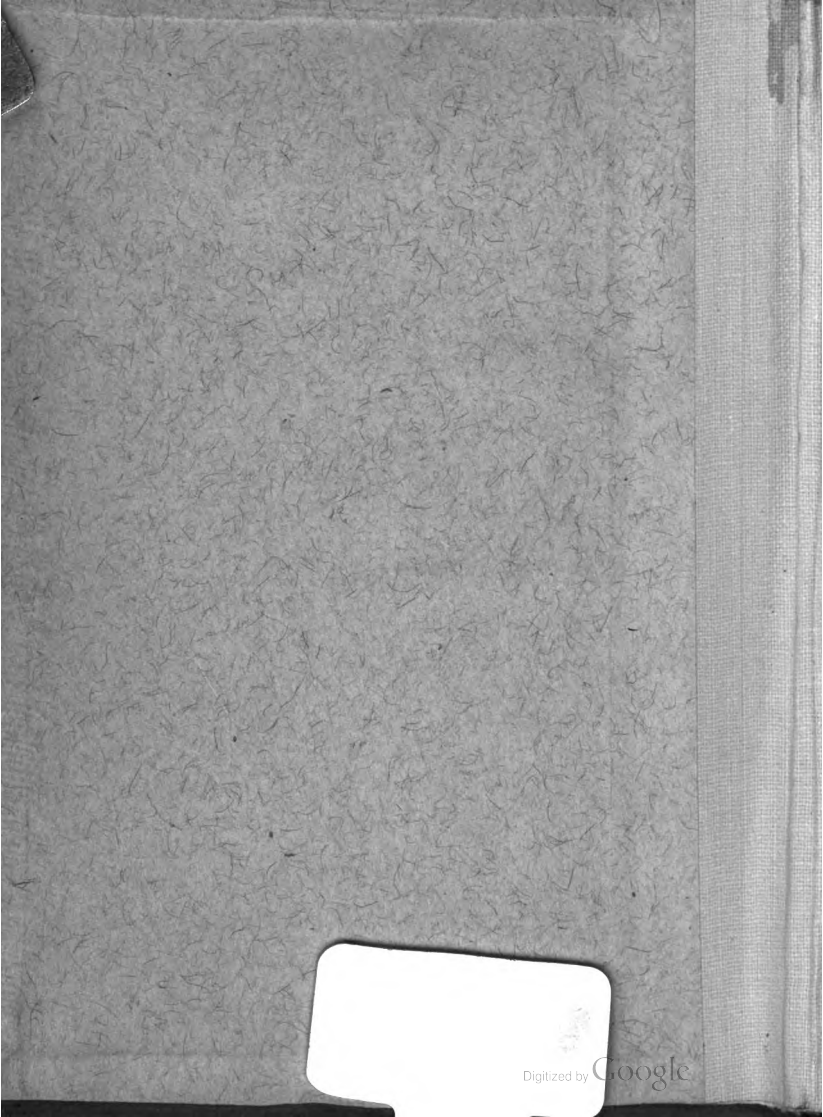
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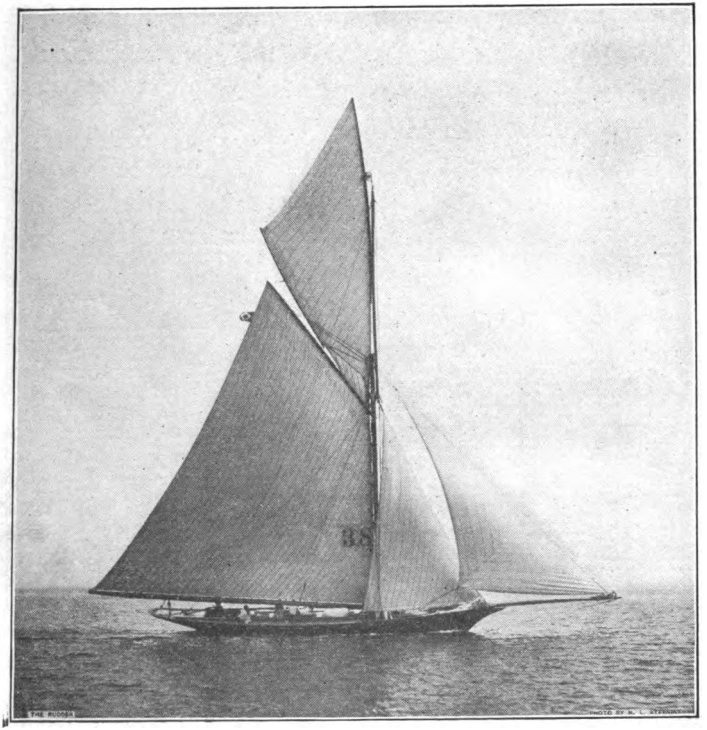

MINERVA

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ON

Yachts

AND

Yacht Handling

BY

THOMAS FLEMING DAY

NEW YORK AND LONDON:
THE RUDDER PUBLISHING COMPANY

1901

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TO THOSE

WHO HAVE SPENT MANY HOURS WITH ME

ROUND THE CLUBHOUSE FIRE

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ON THIS BOOK

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"Books were made that man might pass his knowledge to his fellows; through them he speaks to a vast audience, and his power to enlighten is only circumscribed by the ability to impart this knowledge in lucid and interesting language."

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ON THIS BOOK

MY reason for writing this book is, that it is wanted; my excuse, thirty years' experience. In those years I have handled many boats, upon many waters.

You will find this book very different from other works on the same subject. In the first place, I believe that all text-books should be written in a manner to please, as well as to instruct; that they should be agreeable reading; and, aside from their teaching value, have a certain excellence as a writing. Again, there is nothing in literature so interesting as the autobiography, real or fictional. Nearly all our great works of fiction are of this class. Robinson Crusoe's history from any other lips than those of the castaway would lose half its interest; Gil Blas in the third person would lack warmth and be wholly devoid of its peculiar zest. The flavor of the individual is lost when you speak for, and not as him. The puppet

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talks like a puppet. It is the difference between John Alden pleading the cause of Captain Standish and John Alden pleading the cause of Master John. Let a man talk to you and he will interest and amuse; let him write for you and he will prove trite and dull. Therefore, when imparting information, I like to talk, not write. I want to infuse into my words my person, to endeavor to give my ideas an I-am-with-you tone, so that it will be me and not the book that is present, and with whom you are in communion.

But this method of handling a subject is apt to breed dogmatism, especially as the reader is unable to question or deny the statements made until they have been chilled into ink. So you will find in many of my chapters that I am exceedingly dogmatic. It is unintentional, simply being a manifestation of the spirit peculiar to this style of addressing an audience—one that must hear but cannot answer. Therefore let me warn you to question all my statements, and to accept only those that harmonize with your own conclusions, after you have carefully thought them over. Those that you cannot reconcile to your own knowledge and experience, lay on one side to be tried out at a future day.

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Never, no matter how high the authority, accept any man's coin by its minted face. It is as easy to strike a base as a sterling piece, and the king's head on the reverse and his arms on the obverse won't make lead silver, or copper gold. This in regard to statements made by those who set themselves up as authorities on a subject is particularly true, when the subject is one like this under discussion; one in which no fixed rules may be established, and where so much depends upon the man, the place and the means. I make a statement of practice; it was deduced from my personal experience, and in my case gave a perfect result; you follow it, but owing to certain complicating circumstances, in your case, it fails. For instance, I teli you, that when a vessel gets sternway on in a seaway to keep your helm amidships, and cast her with the headsails, and not to put your helm hard over. You accept my method as being the correct one, try it, and fail to cast your boat so as to fill away. This does not prove that I am wrong in making such a statement, but it shows that I am wrong in not having qualified it. It also shows that you are a lax thinker in not having questioned my method before putting it in practice. My error is the too frequent error of men who write on

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vessel handling; yours the too common error of men who study their books.

The object of this book, of these talks, is not to fill you, parrot fashion, full of rules of action or methods of practice, but to furnish you with food for thought; to lay before you certain statements from which you must, to a large extent, deduce your own conclusions. Take what I say, mix it with your own knowledge and experience, and put into action the result.

These talks are not intended for men who are what we may call seamen, men who are thoroughly versed in the art, nor are they intended for those who aspire to boats larger than forty feet over all. A boat above that size is too valuable to be trusted in the hands of an inexperienced or half-trained man. The owner of a large yacht, if he is not perfectly capable of handling her under all conditions, should hire some one who is. My sermons are addressed to the man who is learning to handle a small vessel, who wants to be a seaman, and who, to be free of all paid assistance, is willing to study the art thoroughly and make himself master of all its branches.

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ON SEAMANSHIP

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"The tar's a smart tar that can hand, reef and steer,
That can nimbly cast off and belay;
Who in darkest nights finds each halyard and gear,
And dead reckoning knows well, and leeway;
But the tar to please me must more knowing be."—

DIBDEN—(*Modernized*).

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ON SEAMANSHIP

I HAVE been all my life a lover of the sea; an observer of its natural and social conditions; a student of its phases and fabrics; but while my mind in its long and wide search has touched upon almost every subject connected with ocean life, the one that has constantly interested and fascinated me is that which relates to the care and government of sailing vessels. This art, which is called seamanship, is one of man's oldest and noblest attainments. What does the world owe to him who possessed it?

To him the civilization of to-day owes its existence. Man cramped in the confines of a continent, a prisoner at low-water mark, a dwarf in a dwarf world, was released, lifted and enlightened by the Master of the Sail. It was he who found the universe upon the sea, and brought it home, a free gift, with the more costly but less valuable trophies of distant trade. It was he who, broadening the world's world, broadened the world's

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mind. With the spices and silks of the East, with the gold and tobaccos of the West, he laded his ships with the new knowledge, a commodity that paid no revenues to the crown, that added nothing to the wealth and glory of princes, but, flowing slowly and steadily into the minds of men, incited the intelligent few to broader, nobler and more splendid achievements, and filtering through the masses, long steeped in inveterate ignorance, uplifted, enriched and regenerated all.

In the shadow of his sail hamlets became cities; wealth increased, suffering diminished. In his callous hands, the helm, that through daylight and darkness guided his vessel from land to land, was more marvelous in its powers than the famed ivory wand of the Eastern genii; and to all who sought to receive, his sail bore more jewels than ever burdened the magic carpet, or came into the hands of the daring and fortunate through the incantations of the Sons of the Hidden Light. While with one hand he struggled with chaffering Trade for her sordid coin, with the other be threw into the laps of Science and Art innumerable treasures. Impartial in his generosity as in his gifts, he gave to Astronomy new constellations, to Medicine rare and efficacious herbs, to

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Art fresh and invigorating colors, and to Literature a strange breed of heroes, novel situations and unfamiliar plots.

The freedom that he found upon the high seas he brought back to cheer the slaves of the mart. Kings bargained for his services, nobles and merchants offered their purses to assist in his ventures. In return for three paltry vessels he presented Spain with an empire; to prove a chimera false he perished among the northern ices. No sea was too broad to daunt him; no land was too distant to escape his search. The miseries he endured, the hardships he underwent, were forgotten in the joys of a new discovery. He opened roads of trade that brought riches and power to his country, and sprinkled these pathways with the bones of his companions—victims of exposure, famine and disease.

No reef lifts above the water, no shallow spreads its treacherous sands, but the frames of his vessel have been broken upon it. The hurricane and calm have taken toll of him; he has paid the penalty of recklessness and greed. He has given to the annals of war its most desperate and bloody conflicts; he has perished that nations might live, and that a people might be free.

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His life gave him strength and endurance; his art made him skillful and courageous. He created and used a language of his own, and his customs were not those of other men. The inventor of the sail, the user of the elements, the discoverer, the trader, the protector, the world's benefactor—the seaman.

A noble art makes noble men, and there is no nobler art than seamanship. As free and changeful in its measures as are the elements it employs and combats, it is prolific of resource, fertile in expedient, and a prompter of mental activity. It promotes skill of hand and tenacity of muscle. Courage is bred in its duties, and the mind broadens in its services.

It is this that makes the practice of seamanship so valuable to those who employ it only as a pastime. The care and handling of the sailing vessel furnishes most excellent training for the young. Aside from the skill it imparts, it takes men out into the open air; it offers to those whom the obligations of life keep at the counter and desk an opportunity to be free, to get away from and completely out of the business world. It gives the mart-worn mind a change and a rest. The sea has no postmen; no telegraph messengers. It prints no newspa-

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pers. The feet of society merely tread its borders. It is a place where man is really free, and where he can realize his freedom.

Many have written upon this art. Some of these works are an addition to literature and of value to the seaman, but the majority are not. On that branch of seamanship, which we will call yachtmanship, and which is principally the art of sparring, rigging, canvasing and handling fore-and-aft vessels, there has been penned several large works and many small ones. The standard books are by Vanderdecken and Kemp, and the majority of the others, I am sorry to say, are in the most part copies of these two. In some cases the authors have lifted their information bodily, and have forgotten to acknowledge the indebtedness. While standard works of their time, both Vanderdecken and Kemp are now out of date, and, moreover, they deal largely with big vessels, and vessels of a type no longer employed in yachting.

Among the smaller works there are several good ones, but they lack originality and do not properly cover the ground, nor do they contain the information which is most necessary to the beginner. Again, many of them have been written by men who are enslaved by one type,

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and are therefore considerably biased; others are from the pen of those who have had a special and not a general experience.

But the crowning defect of all these books, to my mind, is that the authors in the portion relating to handling try to teach a man, instead of prompting him to learn. You cannot teach a man to sail—he may learn. In order to do so he must have the sailor instinct. Unless he has that he will never become a seaman. That is why some men can never learn to handle a boat, and why others will pick up the knowledge in a few months.

Again, there are many men who learn to sail a boat; that is, become possessed of so much knowledge as will permit of their working a vessel from place to place, but yet never succeed in mastering the nicer or more difficult points of seamanship. These are the parrots of the profession—men who simply repeat what they see other men do. The skillful seaman is the man who thinks, who studies his profession, and who learns from his own experience what he cannot from the practice of others.

It is often said that experience is the great teacher. To be sure it is; but even experience cannot teach one who will not learn. The most intense and varied expe-

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rience is of no use to one who casts it aside without first fitting it into place in his life's record by turning it over and over in his mind. Spasmodic storage of experience is of no use whatever; it must be sorted, checked up, ticketed and stored away in its proper place in the next bin to that which it joins in the sequence of events. Unless this is done it will not be forthcoming when needed.

Properly arranged and stored, experience is the mother of what is called "presence of mind," the most necessary mental part for a seaman to possess. Without it he will be a menace to his own safety and a threat of danger to others. Presence of mind is simply applied forethought. You do in an emergency without apparent reflection the right thing, and save your boat, your life, or somebody else's life. People who see the act, exclaim, "What wonderful presence of mind!" but would be more correct, if they exclaimed, "What perfect presence of plan!" You have simply executed at a moment's notice a plan of action that been stored away in your mind, perhaps for years.

When a boy, I frequently amused myself when skating by thinking out what I would do if a person fell through the ice. I pictured all possible situations and methods of

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rescue. One day the accident happened; a boy in skating across the head of a pond broke through the thin ice formed where the river entered the lake. From the hundred skaters present a yell of terror went up, and, as was the case when the immortal Mr. Pickwick met with a similar accident at Dingley Dell, everybody called for help, and nobody offered it. Though at some distance, my attention was drawn to the mishap by these cries. Instantly I responded. There was no mental preparation, no reflection; the proper plan flashed into my acting mind. I executed it, and the boy was saved.

Now, if I had not had that plan stored in my mind, I should have been just as much at sea as the rest were. I should probably have joined them in shouting for a plank or rope, or, like Mr. Tupman, have cried fire, or performed some other senseless act, such as people do when brought suddenly face to face with a dangerous emergency.

One day when running down wind I said to the young fellow at the wheel, who was anxious to learn the seaman's trade, "What would you do if one of us fell overboard?" "I don't know," he answered. "Haven't you ever thought, planned out, what you would do in such

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an emergency?" No, he hadn't. "Well," I said, "you think it out; put the boat in different positions and under different sail, and plan out what you would do if such an accident happened." A day or two after, while the same lad was at the wheel, we lost the dingey. Without calling me from below or hesitating, he wore round and recovered the boat, executing the manoeuvre in so clever a manner as to call praise from all the old hands. When, shortly after, I relieved him at the wheel, he said, "I thought that out the other day after you spoke about what to do if a man falls overboard."

Again, I was on the bridge of a steamer chatting with the mate. "What do you do to pass away the long night watches?" I asked him. "Well," he answered, "I spend hours thinking and planning out what I would do if certain things happened. I put the ship into every possible danger—fire, collision, shifting cargo, broken shaft, and unexpected land. I then plan how best to meet the emergency created. I place other ships in every position —green to port, red to starboard, lights dead ahead, lights on the beam, lights everywhere—then plan to work my ship clear of them. I have some run into me, am sinking, lower boats, save my own crew and rescue oth-

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ers. I pick up lame ducks, pass hawsers, make fast and tow them in. Everything that could possibly happen I have happen, and plan the ways and means of meeting them over and over again. That is how I while away my eight hours in the scuppers."

There was a seaman who had prepared himself for an emergency; a commander who had ready for instant use a plan, so, let occasion demand it, he could stand forth the man of the hour.

Let me advise you who would learn the seaman's art to copy that mate. Spend your idle hours thinking and planning. Never go into a difficult channel without first picturing what dangers may confront you, and how you can overcome them. Never pass through a fleet or come to anchor among vessels without planning beforehand your mode of action. Never turn in at night without first looking about you and outlining in your mind your position in regard to shore and craft, and forming a plan for getting away if anything should happen to oblige you to make sail. After a little practice this thinking ahead will become second nature, and your brain will plan and act with the regularity and cheerfulness of a good clock.

The backbone of active seamanship is confidence—con-

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fidence in yourself, confidence in your craft, confidence in your crew. The first and most necessary of these is confidence in yourself. Without it the place for you is on shore, or in a subordinate position. No man should attempt to command who has shaken confidence in his own skill and judgment. I mean by confidence the true article, not the false, which is more commonly called conceit

Confidence is inspired by action and confirmed by success. You attempt a feat such as you have never attempted before and are successful, therefore you are sure that the skill or knowledge you used in performing it is reliable, and that you are possessed of a mastery over it sufficient to enable you to repeat the act. In plain English, you are sure you can do it again.

Let us suppose it is a feat of navigation. By yourself you have never taken a yacht out of sight of land, but, having the opportunity, decide to attempt to run from one point to another across an open stretch of sea. You take the chart, find the magnetic course and distance, allow for leeway and current, and having thus found your compass course put the ship on it, and away you go. Land soon drops down astern, and you begin to feel a

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bit shaky. Suppose you have made a mistake in laying off the course; not allowed enough for leeway, too much for current. Suppose you should miss the distant cape. This and a dozen other things begin to haunt your mind. You go below, out with the chart, pass over your figures, remeasure the distance, get the same result for compass course—we will say N. E. by E.½E. You go back on deck confident that your course and distance are correct, and then begin to worry about the compass. You are sure it was correct yesterday, because you took several bearings and found it so, and it was also correct two weeks before, on your last cruise. Then you reason that it is very unlikely that it would go waltzing off into an excessive error just because it happened to have been taken out of sight of land for the first time, and so give it back your confidence and steer away N. E. by E.½E.

Your crew now begin to worry, never having been out of sight of land before. They look at you as though they suspected you of contemplating their murder. They walk around uneasily, search the horizon ahead, and cast regretful glances at the one astern, pay repeated visits to the log and act generally like a set of condemned victims. Your confidence under this condition begins to wilt

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again. You take the log index, go below, and find that your passage is half made. You show this to the crew, and they appear half satisfied and half doubtful, despite your assumed air of implicit faith. They seem to know that your face is acting, and that your stomach is not backing up the play. Just then the helmsman calls out that a steamship is in sight ahead. The smoke-boat approaches rapidly, running almost on the back-bearing to the one your craft is on—S. W. by W., as near as you can make it. As she draws near you recognize her as a coaster running between the place you are bound to and the place you have left. Here is positive evidence that you are on the right track. You strut round the cockpit with the airs of an admiral, and the timid members of your crew shrink into their lower garments.

But a few hours after passing the steamer, night comes on, and it begins to blow and get nasty. You call all hands, reef down, and thus check your speed, so that instead of making six knots you are only doing four. Then the wind hauls a bit more forward, and you have to flatten-in your sheets. This increases your leeway, and you decide to allow another point for it—making your course N. E., ½ E. Then you wonder if that is

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enough, and again begin to worry. By this time your crew have accepted their fate, and are in a profound state of despair, beyond even a murmur of insubordination, doing their work slowly and sullenly, as though every act was a part of a preparation to commit suicide.

Down to the chart you go again; pass over the course, and pricking off the distance, find that you are by your reckoning still twenty miles from the landfall you expect to make. The light on it is visible fifteen miles. Laying out this on the chart, you see that you can hardly miss hitting that big circle, and are somewhat assured. Now the wind falls light, and instead of being within the range of visibility of the light in an hour or so, it is three before the log says you have run far enough. You carefully search the horizon for it. No light is visible. A cold sweat begins to break out. You are lost—lost at sea. You must have allowed too little for leeway and have passed far outside of the light. What had you better do, keep your course, or haul up? After thinking it over, and again consulting the chart, you decide to hold the course for an hour longer. How slowly that hour drags away! At its expiration the log shows three and one-half miles more. You are now by your reckoning eleven and

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one-half miles from the light. Certainly you must see it. A long search with the glass; no light. You decide to haul up and try for it to the north'rd and west'rd, but before doing so have one more look. Hello! there it is, a point on the starboard bow. That's the light, sure enough. It flashes; you count ten seconds, fifteen seconds, darkness; again it flashes ten seconds. "Light ho!" you shout.

Has your log overrun that amount? You decide it has; but a few minutes later the light is lost again. That settles it—fog or mist inshore; the log is all right. So you stand boldly on, your whole mind aglow with the triumph you have just achieved—that of making a good landfall. The drama of Columbus at San Salvador is replayed, you taking the part of the great admiral, and your crew that of the conscience-stricken mutineers. You wonder why they ever doubted your skill and knowledge, forgetting that you doubted yourself.

The next day your crew strut proudly about the port like a lot of mariners just returned from circumnavigating the globe. They are proud of you, proud of their vessel, and very proud of themselves. But what a change it has worked in you! You are a very different man to-day

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from what you were the hour you took your departure to make that passage. To-day you have confidence in your skill and knowledge, and in yourself as a user of those powers.

I have written that little sketch to show you that knowing how to hand, reef and steer is not all that is needed to make a seaman. The knowledge of the methods of working sails and ship are only a part of the seaman's craft. His head as well as his hand must be trained. He must not only know his vessel thoroughly, but he must as thoroughly know himself.

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ON BOATS IN GENERAL

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"Is it come?" they said, on the banks of the Nile,
Who looked for the world's long-promised boat,
And saw that the lines he had drawn on a tile
Would make a good cruiser—if it would float,
Thro' pyramids, temples, and mummies stuffed,
We vainly search for this ideal plan;
We fear the Burgess of Pharaoh's bluffed—
Yet there was hope when that day began.

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ON BOATS IN GENERAL

MEN frequently come to me, and ask, "What sort of a boat would you recommend me to have?" My reply always is, "What for?" In that small phrase is contained the kernel of selection—what for? Do you want to cruise, go day-sailing, or race? Do you want it to go alone, or with a crew? Do you want to sail in rough or smooth water?

A boat that is suitable for cruising is not the thing for racing or day-sailing; a boat that would fill the bill if used on land-locked waters would make a poor showing on an open sea or in rough stretches of tide-swept channel.

Let us first consider the racing craft. Racing, as I have often told you, is a business, not a pastime. If you want to win, and those who race usually do, you must subordinate everything to that want. If you don't, you will never be a successful mug hunter. A racing boat

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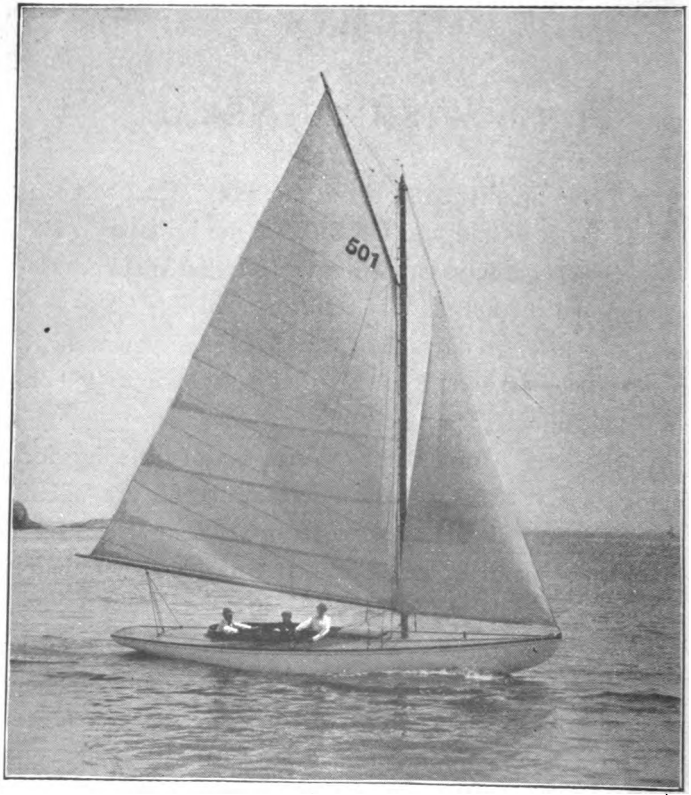

KNOCKABOUT

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must be built as lightly as the law allows. This not only means that her frame and planking must be kept down to eights, but she must be looted of everything that the rules will permit you to remove. She must have large, well-made and consequently expensive sails. Her gear must be of the finest and strongest make, and it must be kept up to the top notch of perfection by constant supervision and repair.

Then you must give up all below comforts and consent to live on bare necessities. You must forego all other pleasures and concentrate all your faculties on one thing —your boat. If you are willing to do this, and have the racing skipper eye and hand, you may pull out all right on top.

If, instead of racing, you just want a boat to knock round in during the day, your craft is far more easily chosen and secured. You won't have to read up several volumes of restrictions and rules, you won't have to nose through half a dozen classes to find the one in which the easiest-to-beat crowd harbor, before making up your mind and giving out your order. You can just suit yourself as to how long, how wide and how deep your craft is to be.

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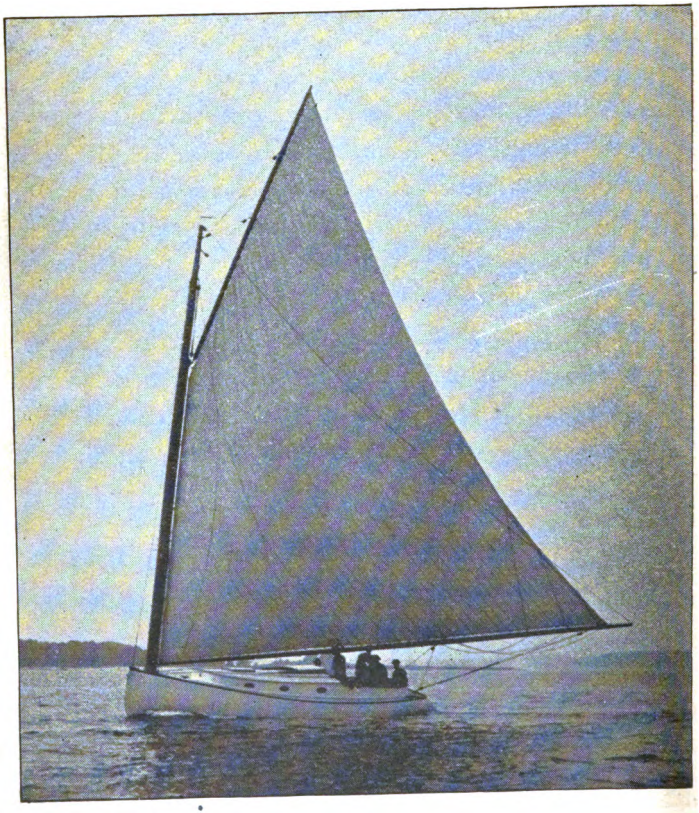

CAPE CAT

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A boat for day-sailing wants to be of strong and reasonable light construction. She needs much more cockpit than cabin, and if the latter is of the summer variety it will be far more comfortable and convenient. All boats should have some sort of a cuddy or cabin, especially if they are to be used to take out women and children.

A day-sailing boat, if to be used for taking out shore people, should be absolutely uncapsizable and, if possible, fitted with tanks of sufficient power to float the ballast. Her rig should be simple, and her canvas of moderate expanse. The less gear and gewgaws she has about her the better, as it means a saving of work at all times, and especially in getting underway and coming to anchor.

The two best rigs for this class of boat are the cat and knockabout. Both these rigs are quick and easy to handle, and having no bowsprit, they can be brought up to a landing anywhere where there is water enough to float them.

There is no better day-sailing boat in the world than the cat that is used along our Eastern seaboard to take out fishing and sailing parties. I don't mean the overcanvased brute that is frequently met—a vessel that takes

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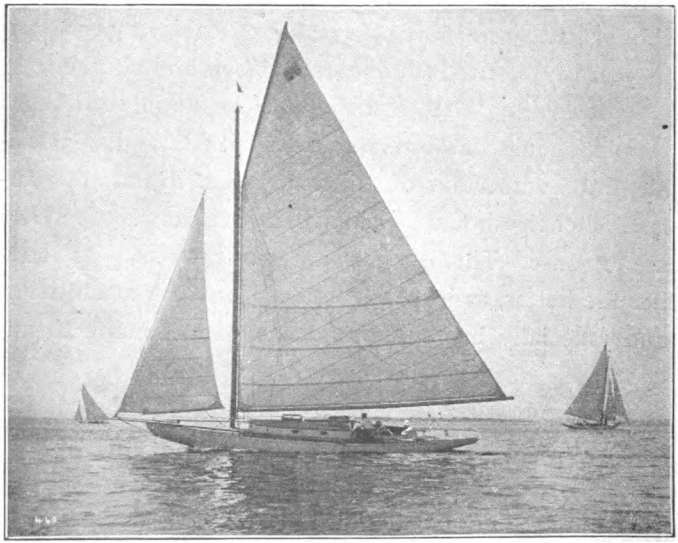

RACING POLE-MAST SLOOP

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all hands to steer, and a double watch to shorten down, but the properly sparred and balanced boat. I have handled many of these boats, and under our ordinary summer conditions have found them to do what was expected of them in a boatly manner. In skillful hands they are as near being absolutely safe as it is possible for any water-borne fabric to be. One of their chief advantages is that they can be got under sail or be relieved of it quicker than any other type. They have but one sheet and two halliards to look after, and all these can be tended by one hand without leaving the cockpit.

The knockabout has many of the cat's good qualities, and is in some respects a better rig, but the jib is apt to be a nuisance at times. The disadvantage of the knockabout is that, being a narrower model than the cat, you are cramped for room where it is most needed—aft. Owing to this latter rig being in fashion, the cat has fallen out of favor, but there is no better boat for the young sailor to begin his studies in. An open cat—that is, one half-decked, say of sixteen feet length—is just the thing for a boy to learn the sailor's trade in.

Now for the cruiser, and its name is legion. But out of the lot there are more bad than good ones to be

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picked. A cruiser, in the first place, is a house—a home for days, and perhaps weeks and months. Therefore, she must furnish sleeping and eating accommodations. This means room to stretch and stand, or at least sit upright. A cruiser in which a man cannot live in comfort is no cruiser.

Then first, in selecting a cruiser, the accommodation must be looked to; that is why when a man who knows anything starts to buy one he invariably puts the question, "What is her head room?" The answer generally tells the whole story. The next important query is, "What is her draught?" the third, "What is her rig?"

Unless you can sit up and lie down comfortably the the boat is no cruiser; you can at once make up your mind to that. While no man expects to spend the greater part of his time below, the time he does spend below is that in which he seeks rest, and must get it; this is impossible in cramped quarters.

The importance of the draught depends largely upon where you want to sail and harbor. Your draft should never exceed the low-water depth of the channel you have to pass through in order to reach your anchorage. In our northern waters three feet is the minimum draught

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required; in southern waters less is almost necessary. In some localities three feet is the maximum draught. Short draught has the disadvantage of forcing the bulk of the boat above the water line, and the making of high houses, in order to get head room. This produces a boat that offers considerable resistance to the wind, and consequently makes excessive leeway. They are also unsteady at anchor, and hard on the ground tackle.

Deep draught cuts you out from many harbors and sheltering places, and in getting from port to port along shore frequently obliges you to take the longest way round, but it has the advantage of giving a firm hold on the water and of keeping the weights and windages down low. But, as in everything, there is a happy medium—a betwixt and between.

It may be stated that for all reasonable purposes on a cruising boat of 40 feet and under to be used on our coast, a draught of five feet is sufficient. All over that will prove a cause of worry and a hindrance to pleasant voyaging. With this draught you can pass into nearly all our bar harbors and navigate with safety among the shoals in our sounds and channels. I prefer to limit my draught

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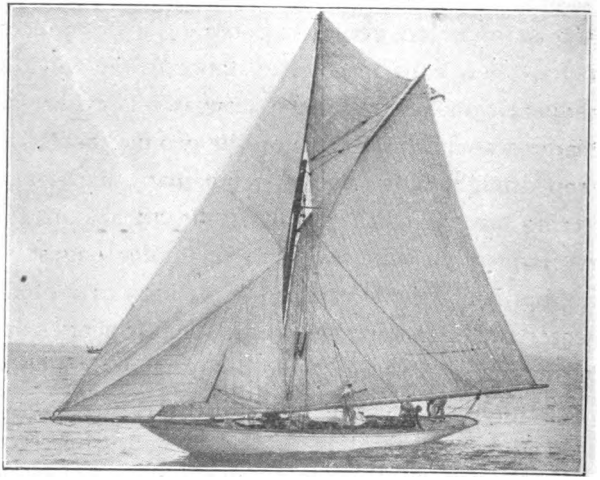

CUTTER RIG

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to three feet, but then it is my peculiar pleasure to sail where other men seldom venture.

It is difficult to get a weatherly keel boat on four or even five feet draught. A boat to be good to windward must have a deep plane of resistance. This makes it almost impossible to dispense with the centerboard in small boats. But as soon as you admit this contrivance into your plans you partly spoil your accommodations. Many designers have tried to get round this by combining the two forms. Putting in a half board that houses in the keel and does not come above the floor. Such of these as I have seen have proved to be poor makeshifts, and the result is the spoiling of what would have been a good keel boat.

While fully aware of its disadvantages, I am a firm believer in the centerboard for small cruising boats. That it weakens a vessel there is no doubt, but with the modern method of building the trunk the injury to the fabric is very slight. The saying that "A centerboard boat always leaks" is more fact than fiction, but in several modern yachts that I have cruised in this is not so, the trunk having been constructed in such a way as to resist the strains which are the cause of leakage.

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Now to return to the subject of accommodations. A cruising boat should be of such shape as will give the largest interior possible in a given length. In this the older type of yacht was far superior to the modern. In the boats of to-day a man pays for a great deal of hull that is of no use to him, except for looks and speed. The long overhangs provide plenty of deck room, but they add nothing to the cabin and but little to the storage space. In an up-to-date boat all that is habitable is the middle third. In such a craft, 30 feet over all, you can get but 10 feet for cabin. I have seen a 40-foot boat, which was advertised as a good cruiser, in which there was sleeping room for two. Compare this with the accommodations furnished by an old-fashioned plumb-ender, or with a Cape cat. One of these latter of 20 feet has more room than a modern 30-footer of the up-to-date model.

The extreme overhangs are all right in racing craft, but they are a detriment and a danger in cruising craft. The same may be said of the extreme full bow. There never was, and probably never will be, a set of ends better adapted for all-around work than those carried by the boats of twenty years ago, as shown in Minerva and

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yachts of her day. This is what is known as the half-clipper or schooner bow.

In boats of this type there is sufficient overhang to prevent their diving and to give them sufficient buoyancy to lift easily over a sea, at the same time the ends are not long enough to trip the vessel if running in large water. Again, the entrance and run are sharp enough to fall without pounding—a disagreeable habit that full modern boats are possessed of. The most serious objection to the modern boat with full and long overhangs is that it will not lay-to in heavy water bow-on. Just as soon as you put it to the wind and check its headway it will fall off in a trough and work around stern to the sea, a very dangerous proceeding. It is a splendid runner, and remarkably dry when so engaged; in fact, it seldom ships solid water when going either on or off the wind, and is less liable to pooping than the older types, but when brought to face a sea it pounds and sags and is exceedingly uncomfortable. To one who has never experienced the sensation it is impossible to picture the punishment these full-bowed vessels receive when driven against a head sea. This pounding brings a terrible strain on the spars and rigging and is very wearying to the crew. I

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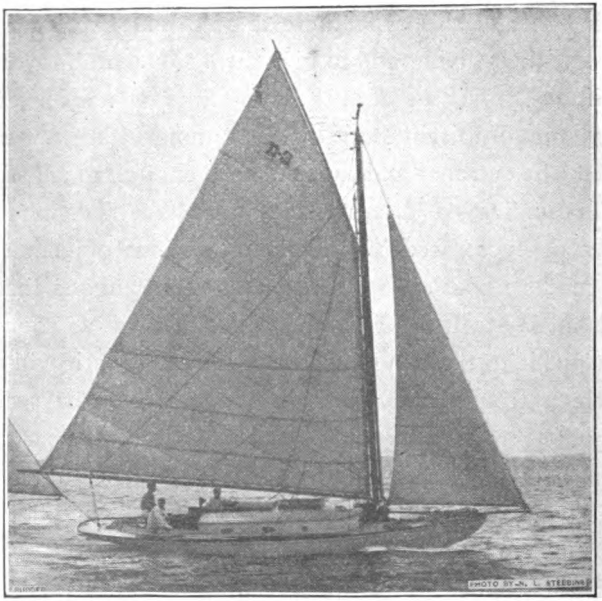

JIB AND MAINSAIL CRUISING BOAT

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have known a sea striking under the stern of one of these boats to throw the crew off their feet, badly injuring one man. The mate of a large English yacht who had crossed the Bay of Biscay in her on the way to Gibraltar told me that he had never in all his sea experience had such a terrible knocking about. Every man on board was a mass of bruises when the vessel made port, and the copper was torn off her bows back for eight or ten feet. Yet this boat's bow was nothing like so full as that of many of our yachts of to-day.

If you go to the other extreme, and cut all end off a boat, giving her a straight up and down stem, she is a bad runner and very, very wet. The cutters of this type were most uncomfortable sea boats, being constantly deluged, but they would eat out to windward in heavy weather and lie-to a sea like birds. Between these two there is the end which is the one for the cruiser to use

The ideal end is one that will lift and lower slowly, allowing the vessel to fall and rise without jarring or jerking. This sort of end will, when falling, bring a vessel slowly to when the extreme point of the fall is reached. With the plumb stem a vessel is apt to go too far, deluging the decks, and in one with the full long bow, not far

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enough, jarring the whole fabric by suddenly checking the motion. It is of course impossible to have absolutely perfect ends on a vessel, as concessions have to be made to other purposes, but the ends of the majority of our modern yachts are decidedly bad for rough-water work.

Another serious defect in many cruising boats is want of freeboard. There is no excuse for this. A low-sided boat is wet and uncomfortable, both inside and out. You see many boats of this description with scant freeboard and excessively high houses. The only object to be gained by keeping the freeboard down is to reduce the windage and weight, important items in racing craft, but of little matter in a cruiser. Farther on, in speaking of handling in rough water, I shall explain the advantages of freeboard.

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ONE-MAN BOATS

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"Alone, alone, all, all alone,

Alone on a wide, wide sea!"

COLERIDGE.

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ON ONE-MAN BOATS

THIS is a subject upon which volumes of rot have been written by men who ought to have known better. We can forgive a man of no experience for writing absurdly upon a subject, but when those who have had experience in handling craft alone come out in print in advocacy of an utterly unsuitable type of vessel it is about time for somebody to call them down. It is the books of such men that have made common the idea that the single-hander's vessel must be a sort of enlarged toy boat; in consequence, whenever a single-hander is pictured, it is of that type.

The principal cause of this error is that the men who have taken charge of the task of disseminating information regarding the single-hander are of a class that, as a class, look upon small things as making big things and not as big things being made of small things. Consequently they give more importance to any part than they

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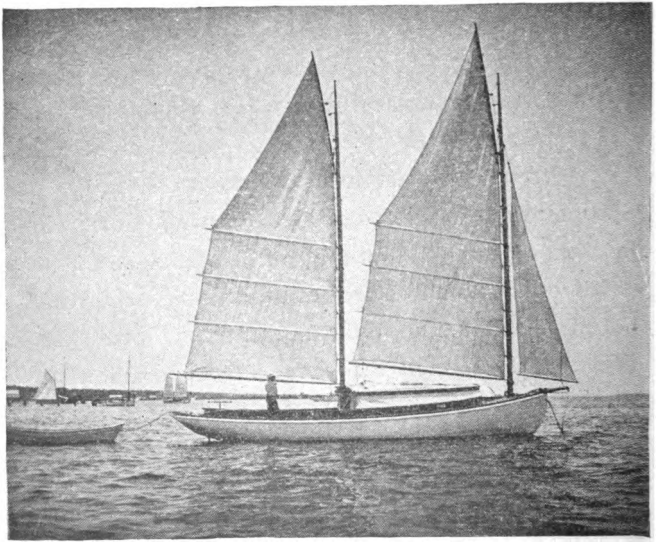

SINGLE-HANDER

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do to the whole. Then they are the servants of an idea; this once firmly fixed they distort all out-doors to fit it. All evidence to confirm is at once admitted, while just as quickly the door is shut in the face of whatever does not go to prove their first and final conception to be correct.

Almost every man I know of who has contributed to the literature of the single-hander has first sat by the fireside and designed a craft and then built and sailed it to prove that it is the only perfect thing.

Go over a fleet of this kind; what are they? Either big toy boats or small copies of large vessels. While they may perfectly fit the theory and be theoretically perfect, they are practically of no use, or else inferior in many ways to a boat of the same dimensions designed by experience. The earliest types of these boats were closely moulded upon the lines of fishing craft, being models built to withstand the rough usage of that trade, and suited to oar and sail alike. That a craft like this matured in a rough locality is the best for its purpose is frequently true, but that it is best for another purpose is as frequently false.

This is an error common to many who have advocated

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some local type of boat for universal use. Having employed it successfully in certain waters, they imperatively assert that it will suit all waters, and having found it to answer one purpose, they are equally certain that it will answer all. It is the old story of the blind men and the elephant—that of forming a compound conclusion from a single observation.

If a man cruise, and cruise without assistance, the first important thing is that his craft be one that he can handle without excessive muscular strain. Therefore she must not be heavy for her size, and her gear must be of such weight as will readily permit of his working it. The gear must be simple and of strength; the rig one that needs the least attention. This is exactly what the typical single-hander is not.

The typical single-hander is a coarse-lined, heavily built craft, with complicated gear and divided canvas. She is generally very full-bodied and badly overloaded with ballast. Her initial stability is great, and her helm action slow. This is the type of craft advocated by nearly all who have written on this subject. One of the prime virtues of this type in the eyes of single-hander writers, is, that such craft are good sea boats. A few

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years ago boats of this description were more common than they are to-day, but many are still afloat. The favorite rig is that of cutter or yawl.

These boats are safe—that is, they seldom capsize—and are good sea boats, if simple ability to float in rough water constitutes a good sea; but they are slow, awkward to handle, and utterly unable to make way in rough water and heavy winds.

Off the wind in all weather they move slowly and steer badly and in light breezes are logs. One of these boats that I handled would yaw four points either way when running off in a following sea, and when close-hauled in a blow would lie down and sag off bodily to leeward. It was utterly impossible to get her to windward except under conditions of a smooth sea and steady breeze, weather in which any vessel will do her best.

I remember once seeing a small cutter-rigged, single-hander trying for several hours to beat round Matinicock Point against a head sea and wind. This vessel, which was built after the plans of a celebrated single-hander's boat, was a failure on every point of sailing. Another time we passed a small cutter off Saybrook; she was jumping up and down and chopping waves at a

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great rate. Our consort, who had passed the same point two hours before, reported speaking the yacht in almost the same position, and no doubt she would be there yet if the wind and tide had not shifted and lifted her in.

The essential element of safety in all vessels is the power to move forward under all conditions of weather. This is especially so of a sailing craft. There must also be a perfect and rapid obedience to the helm. A slow-moving or sluggish craft is a dangerous one. The smaller the vessel the more true this is.

The other element of safety is the mobility of the rig. The ability to make, reduce and shift sail rapidly is essential to safety. This is only possible when the sails and spars are proportioned to the strength of those manipulating them, and the gear of the simplest and most direct description. The over subdividing of canvas is bound to complicate the gear; the keeping of the canvas in large sails to make the spars heavy and unwieldy.

The most perfect type of boat and rig for one man to handle is the cat—in theory; but in practice it fails in many ways. If the weather was a constant it would be the ideal rig. But winds are changeable things in all localities. So long as a cat can carry her whole sail comfort-

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ably she is the safest and most easily handled rig in existence; but once reef her and she forfeits much of her ability. Then again, in strong winds, she is a bad runner, and her sail being large and well outboard she is difficult to reef. For windward work under favorable conditions the cat is unrivaled, and as a one-man boat she is for some purposes without a peer. But I do not recommend the rig for single-handed cruising.

Let us next consider the sloop. This is, except for very small craft, an inferior rig for the purpose to the cat, it having all the latter's faults without any other advantages to compensate. In single-handers under 20 feet top measure the sloop rig will work very decently. But it is decidedly inferior to the knockabout, for the reason that in order to expand its canvas both the boom and bowsprit must be carried outboard. This latter rig, if kept down to reasonable proportions, is better than either cat, sloop or cutter for single-handers under 30 feet top measure. But all these three rigs have the one objectionable feature, that in order to reef the boat must either leave her course or be hove-to while the operation is performed, a serious disadvantage under rough conditions.

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In a full-manned vessel, reefing, when the proper method is employed, is a simple affair, but reefing by one hand is always a long and troublesome job. If the vessel cannot be kept on her course and is brought to the wind the work is made much more difficult owing to the rolling and pitching. Not only is this the case, but it is very often dangerous to venture on a bowsprit at such a time or to hang out over the stern in order to secure the cringle-lashing. Any one who has reefed a jib when the boat is head to the wind and pitching into a steep sea will not deny this. Last summer in reefing down, owing to the weight of the wind, I was obliged to take the sail completely off my boat, as it was impossible to knot the points with the canvas straining; losing her way, she fell off into the trough of the sea, which was running very large, and rolled so heavily that she threw all hands off their feet. We could do nothing but hold on until at last we were obliged to run her off under the peak and reef her running. This manoeuvre cost us a good two miles of hard-won weather gauge.

The three best rigs for single-man handling are the ketch, yawl or sharpie, or double cat, as it is sometimes called. The advantages of the yawl and ketch rig I have

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explained in another chapter. The double cat is also fairly good, but its chief objection is that the stepping of the foremast in the eyes of the boat makes it close work forward and the lack of a bowsprit increases the work of handling the anchor.

As to the size of a single-hander. I have handled boats of 35 feet, top measure alone, but it was labor; the ground tackle for such a craft being a big lift for one man. The only advantage of a long boat is the increased speed and accommodation, but the latter is generally not wanted.

I would recommend for this purpose a boat of not over 30 feet—25 is better—and of either yawl or ketch rig A moderate sail plan, light spars and strong rigging, the iron work especially being extra heavy. The hull, while strongly built, should be clean-lined, and, above all, stiff and weatherly. The last is the prime necessity. She must be capable of going to windward under any set of sail. At least half her ballast should be inside, firmly secured. She should steer with a wheel.

We can summon all this up in one sentence, that will concisely describe the ideal single-hander: A fast hull and a small rig.

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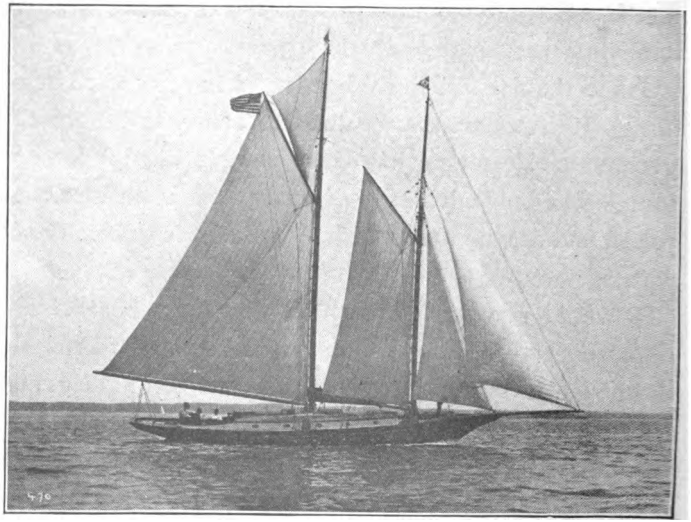

FULL-RIGGED SCHOONER

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ON SEAGOING BOATS

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"The sea and the wind are not our enemies. They seldom destroy our vessels without our connivance. It is our own folly, neglect or carelessness, that opens the way for the attack."

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ON SEAGOING BOATS

THE first and absolute necessity of a seagoing boat is freeboard; the second is a complete deck and water-tight openings. Given these two things and you have an almost safe craft. There is no question of capsizing a well-designed yacht of to-day by power of the wind. Our outside ballasted boats cannot be kept wrong side up, so long as the water is kept out of them. They may be hove down on their sides and fill and sink, but they cannot be turned completely over so long as they retain their buoyancy. I have been in one of them, a boat carrying only about half the usual weight of lead for a vessel of her size, that was laid on her side in a squall with both mainsail and jib in the water; she remained in this position for nearly two minutes, and then righted when the force of the squall was spent. Her lead kept her from turning right over, and her large freeboard kept her from edging down. She simply made a

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bottom of her side and floated on it. That is one advantage of freeboard. Had she been a narrow-sided boat she would have been forced between the pressure of lead and wind deeper into the water, but as it was her displacement, owing to the bearing up of the sail and mast, was probably less when in that position than when standing upright.

Again, freeboard increases the range of heel. This is of enormous advantage when sailing in a sea way with a strong breeze. The tripping power of the wave is exhausted before the rail is brought down, and the boat not receiving a load of water on her lee deck rights so much quicker. A low-sided boat when canted by a beam sea edges her rail under and shovels the water up on her deck as she recovers. For this reason seagoing craft should have their upper freeboard slightly tumbled home. Bulwarks and high rails are bad things, and combings should be kept well inboard, while raised cabin houses if fitted should not be carried too close to the waterways. Rails and bulwarks as far aft as the rigging can be raised to an advantage, as they prevent the water from coming in and not passing out. Water in breaking on board will always follow along anything like the side of a house, and

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when reaching a break spread in. This is how cockpits are so easily filled. The height is suddenly cut down from house to combing, and the sea having become crowded up to the height of the house in its passage aft, when it comes to the low place rushes into the cockpit. If the combing is carried up to the height of the house the water will pass along and go out over the stern.

Ballasted boats should never go into rough water unless they have water-tight cockpits and water-tight companions and openings. But a water-tight cockpit, unless it is well-scuppered and really self-bailing, is of little use. In eight out of ten small yachts the cockpits are not, although they pretend to be, self-bailing. They will bail perfectly when at anchor. In order to bail quickly the floor must be at least ten inches above the load water line. Here again freeboard comes in. Again, the placing of the scuppers in the forward end of the cockpit and their outboard openings under the bilge is decidedly wrong. In the first place it keeps the water at all times in the forward end of the standing room against the cabin, just where you move about; in the second every drop that goes out through the lee pipe has to force its way against a pressure. This pressure is also

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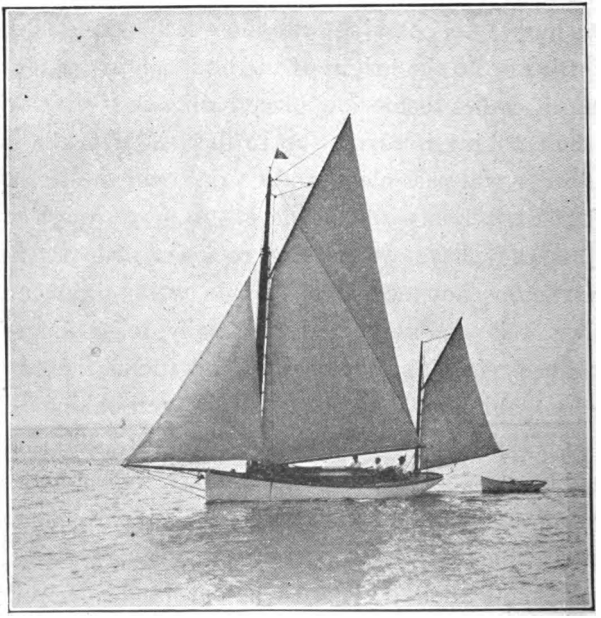

A Seagoing Boat

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constantly driving the water up and into the boat. The place for the scuppers is aft with the openings under the stern. Here there is constant suction so long as the boat is moving ahead, no matter to which side or how far she heels. Again, if the floor is sloped aft, whatever water is on the standing room will run aft and be out of the way, a measure of comfort that those who sail in rough water can appreciate. It is not generally known but a boat going at speed of four knots and over will, if equipped with proper scuppers, siphon, i. e., suck the water out.

Another bad practice of builders is to put stationary seats around a cockpit with lockers beneath them. This never should be done. You cannot keep them tight, the wood being constantly subject to water and sun. Never put lockers of any kind in a boat with outboard openings. Another bad practice is that of putting in low companion thresholds. The threshold of the companion should be as high or higher than the side of the boat, and should on no account, no matter how high the cockpit floor is, be on a level with it. The usual manner of constructing companion doors is also open to objection. The new method in which the door slides down into a recess

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through a rubber-packed joint is far better than the old way of closing. Such a door can be made absolutely water-tight, and can be opened without being opened. This enables you to see into the cabin or out of it without running the slide back or risking getting a wash below by opening the doors. These may seem trivial details, but it is the neglect of such to whose account the loss of the majority of seagoing vessels must be placed. Poor hatches and low, badly protected engine room skylights are responsible for nearly all the steamships that go to sea, and are never heard of again. Keep the water out and you can live out anything in the way of sea or wind. Let it get in and everything that before made your craft seaworthy will be an aid to your ending. Your ballast will be a weight to sink you, and the empty space that gave you buoyancy so much room to quickly fill with water.

After this, look to your pump. Where is it? In most yachts directly amidships, drawing out of a well over the lowest part of the keel. Where should it be? In the place where it can be used when most wanted—the bilge. You must have a means of drawing from the center, so you can pump out when at anchor or sailing upright.

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But all pumps should have a bilge intake. It would be a very simple matter to make such a connection with a cock to cut off the other intakes. How often, when he least wants to, has a man to let his boat up, so as to get the water amidships for the purpose of pumping it out. If he could pump from the bilges this coming up would be unnecessary. To kill a boat's way in a heavy beam or head sea, so as to get her on her keel, is a dangerous artifice; but it must be done with the pump amidships, if you want to get the water out, and keep a dry cabin. Every seagoing small yacht should have at least two fixed pumps, and a movable one. The fixed pumps should be constantly looked to, and the limbers kept clean. Never stow inside weight alongside of or over the intake, and never allow rubbish to be swept into the spaces between the floors. With a good pump a man can keep down all the water that will work into a tight boat through her bottom, topsides and deck.

All seagoing yachts should have the rudder post boxed up and carried well above the water line. The neglect of this is the cause of much leakage. She should also have in her rudder blade a boring or rod in which to make fast emergency lines or chains. In craft that

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have their rudders well under them a rod must be used, but in shallow boats with broad blades a hole bored through the outer edge will do. These lines are extremely useful when anchored in a sea way; by hauling them taut over either quarter you can relieve the strain on the head of the post and gear attached to it. In case of a breakdown of the quadrant, wheel or post head, you can at once take control of the rudder and keep the boat under command.

No boat should go into rough water for a long run unless she have ringbolts aft for the purpose of passing boom lashings, and also a fixed boom crotch, or at least one that can be made immovable. There is no other way of keeping a boom steady when the sail is lowered down. You cannot by any possible means do so with lashings, unless you can horn it in a crotch. A loose boom is a constant menace. Provision also should be made for the trysail sheets, and for body lashings for the crew, and lashings for the boat, even if you have davits. The principal weak spot in the rigging of a boat that is to be driven in heavy water is the bobstay. That piece of rigging is often carried away in a sea than any other, and usually it is the bolt that goes. Look to it, and look to

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it well; for if it parts, most likely you will lose your mast. The only safeguard lies in rigging a preventer stay that will set up with a tackle, the fall leading inboard. The stay should be of wire rope properly and strongly secured to the stem. Use either a gun tackle or luff tackle —the latter is preferable—and be sure to give it plenty of drift. When in use, set it up just scant of the strain, so that if the bobstay parts it will catch the strain before the spar gets a good spring. In boats that have a forestay set up to the stem head there is less likelihood of this accident happening; but it is always best to have a preventer fitted. Make the fall fast around the bitts or mast where you can readily get at it, and hold a turn to set it up. Seagoing boats should have two shrouds on a side and set up with lanyards in preference to rigging screws. If you fit the latter, have them about twice the size of those ordinarily put on by riggers. She should also have a heavy set of masthead runners and duplicate eyes to set them up to, one pair being placed well aft. Our modern full-bowed boats are very hard on their rigging and spars when in a sea way, and need to be heavily ironed.

Outside of her ordinary sails a seagoing yacht needs a

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trysail, a small square sail, and a small jib or staysail, all made of heavy canvas. Particular attention should be paid to the roping and clews of these sails. It is of no use using heavy canvas if the clew irons are frail and the rope light. A gaff-headed trysail is better than a jib-headed, but it is more bother to set. Care should be taken to see that the cleat or ringbolt for the trysail sheet is in such a position as will allow the sail to be properly sheeted, for a trysail when used for riding must set flat, or else it will bang itself to pieces.

In seagoing craft looks don't count, and therefore be not afraid to make all your rigging heavy and strong, and wherever possible have a fitting or tackle that can be instantly made to take the place of one that carries away. Always when in rough water or in heavy weather keep a vang or down-haul on the peak of the gaff. It is sometimes the only thing that will bring the sail down, and it gives you command of the spar, especially when the yacht is rolling heavily. The chafing of gear when in a sea way is constant and ruinous. To prevent it a close watch must be kept on all ropes where they pass through blocks or lie against spars or other ropes. If your hal-

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liards and sheet remain long in one place they must be canvased or armored with some sort of chafing stuff.

One more important thing. Whenever you get far from land, lash the oars and rudder in the dingey. Then put in a good long coil of light line, a bucket, a jug or breaker of water, and enough food to last for a day or two. Lash these in so they cannot get out. Many a life has been lost and many a man has suffered horribly because these simple precautions have been neglected. Something suddenly happens to the yacht; it is a case of boat at once. The crew throw the boat over and jump in. Too late they find that the oars are gone or that there is no water or food. The bucket and rope are for use as a sea anchor.

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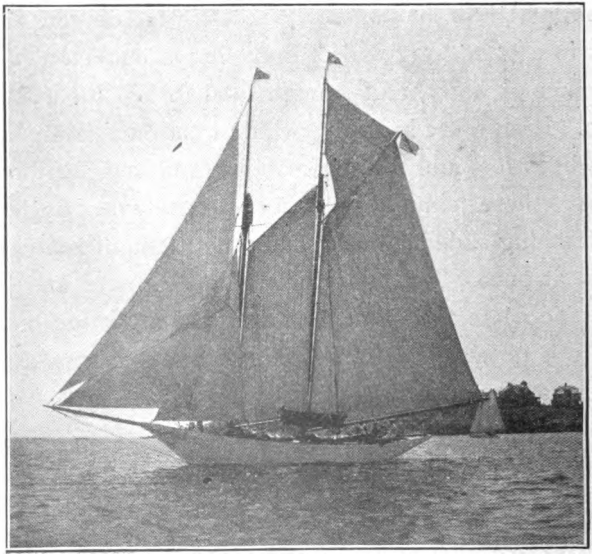

FULL-RIGGED SCHOONER

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ON RIGS

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"The present tendency of canvasing is to increase the number of sails on cruising yachts, and to decrease on racing craft. Experience teaches that in both cases we are doing the right thing. Ultimate speed is found in single sails; ease of handling, safety and mobility in divided sail."

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ON RIGS

IN discussing rigs suitable for cruising we may at once dismiss from consideration several that are in common use, but which are not adapted for service in our waters, or are distinctly inferior by reason of being difficult to handle with small and unskillful crews. We will, also, dismiss the true cutter rig from our considerations, as it has almost passed out of use, its place being taken by the modern type of single-sticker, which is part cutter and part sloop. This combination rig is not in its full sparring suitable for boats under forty feet, but when stripped of the topmast it is in some ways an excellent type.

We can also drop the cat, and what is called the cat-yawl, from our list. The four rigs to which I shall call your attention are the pole-mast sloop, yawl, ketch and schooner.

The pole-mast sloop, of which the knockabout is the

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commoner specimen, is an excellent rig for use on a cruiser. The difference between the sloop proper and the knockabout is in the method of spreading the canvas; in the sloop the canvas is spread fore-and-aft, a large percentage being forward of the mast; in the knockabout the much greater part of the spread is in the mainsail, and the hoist is higher. The tall, narrow-peaked mainsail of the latter is its characteristic feature. The jib is small and tacked down to the stem head.

The disadvantage of this rig is that sufficient canvas to drive a heavy, full-bodied boat cannot be spread; consequently, a true knockabout is a comparatively roomless craft.

The false knockabout, a bastard craft that is becoming very common, is one in which the sail area is increased by extending the headsail on a bowsprit, and running the boom outboard.

The pole-mast sloop has many warm advocates, and is without question a far better rig than the old sloop, hampered with topmast and lofty gear, but it shares with all single-masted vessels the faults that are common to the type. The most serious of these is, that you cannot

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shorten sail except by reefing. This can be done with the yawl, ketch and schooner rigs.

I have heard many men, and men of experience, decry the yawl rig, giving as their opinion that it is inferior in every way to the short-rigged sloop. But I have generally found that these men have formed their judgment from the actions of one boat, and that failing to confirm preconceived opinions they have condemned the type, root, bole and branch.

In an article upon the yawl rig, written some time back, I explained one of the reasons why this rig came into favor, and why it has lost favor with many who at first highly valued it. I cannot do better than reprint these remarks:

It has been said that the worst enemy a man can have is his best friend. Howsoever this may be in the world of men, it is most certainly so in the world of things, and nowhere has unmeasured eulogy of the best friend wrought greater havoc than in the case of the yawl rig. Unfortunately for the yawl rig, it has been repeatedly chosen to drive the craft of the writing lonesome sailor, and consequently it has figured to a marked degree in yachting literature, and as these writers have lavished

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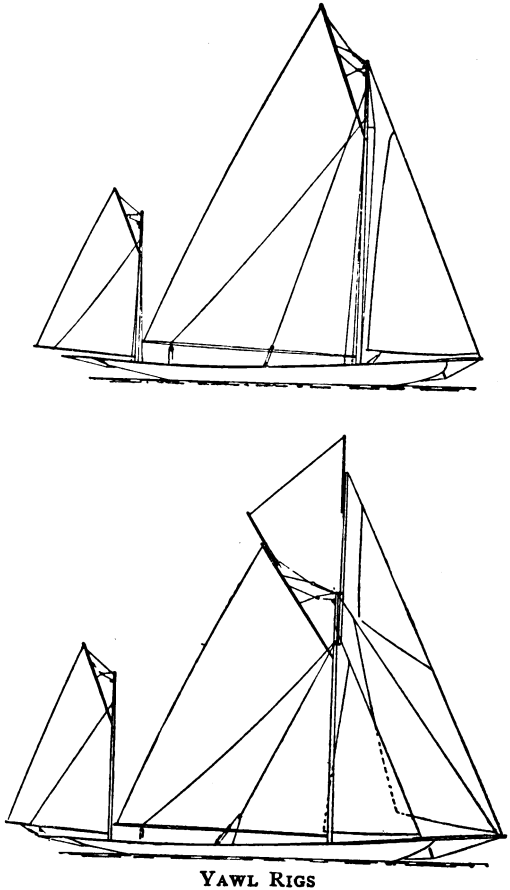

YAWL RIGS

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upon it page upon page of unqualified praise, the effect has been to lift the rig into a singular and prominent position, and to surround it with a glamour not the less charming because a sparkle of truth concentrates and enhances its delusive glitter.

There is no question but what narratives like those penned by the famous single-hand sailor McMillan were the cause of the yawl's sudden elevation to favor in American waters, and there is no question but what some books are responsible for much of the fabulous that envelopes the rig. There are few of us who would be ready to swallow all that a lover might say in praise of his mistress, and yet a man is just as likely to magnify the points and virtues of his vessel as he is those of his Dulcinea; therefore we cannot be too careful in accepting the evidence of the infatuated yachtsman or in adopting his finding as infallible precedents. For, often carried away by the good behavior of his craft, he jumps at a conclusion, attributing to one quantity that which should be adjudged to the fabric as a whole. This is often the case; and again, too frequently is the rig of the vessel blamed for results which are the sum of de-

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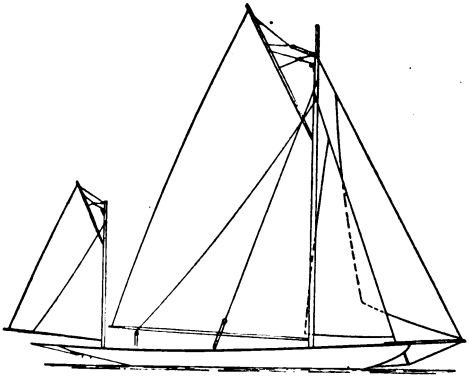

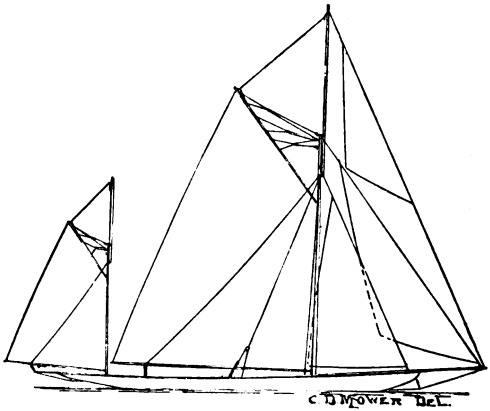

YAWL RIGS

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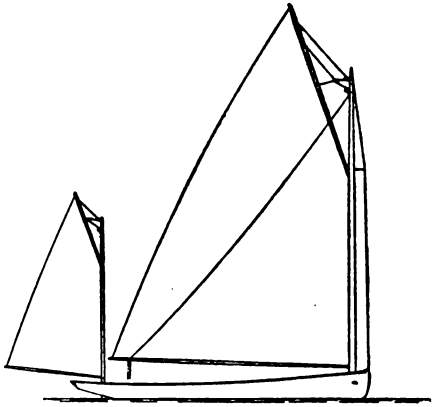

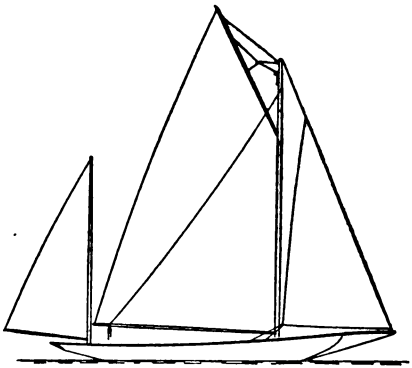

YAWL RIGS

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fects altogether foreign to a peculiar sparring and canvasing.

The unqualified praise which has been lavished on the yawl rig has, as is usual, awakened a no less unqualified storm of dispraise. While the yawlman has, with that noble effrontery which distinguishes the true crank, claimed for his favorite rig everything in sight, the recalcitrant unbeliever has as broadly denied it, even those common virtues which one supposed to be possessed by even the meanest and most primitive craft.

I have no hesitancy in saying that so far as the driving value of the mizzen is concerned it is an unimportant quantity. This is especially so when on the wind. On most of the yawls I have handled there has been good cause for this. In the first place, the boomkins were too short, and the other spars too light. You cannot expect a sail to sit properly and hold its draught on buckling spars. The lead of the sheet is such that the boom cannot be kept rigid, and just as soon as it blows its end turns up like a pugdog's tail, throwing the canvas all out of shape. Then the back-wind from the mainsail makes it impossible to keep the mizzen full unless it is sheeted very flat. On yawls with gaff-headed mizzens

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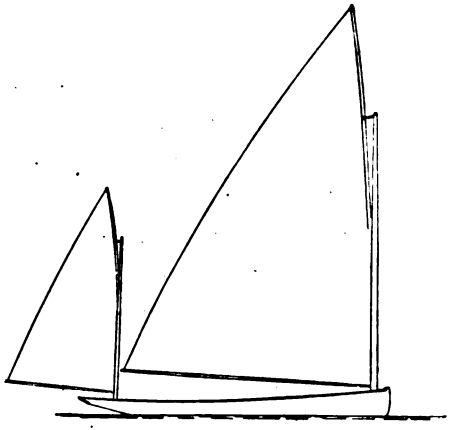

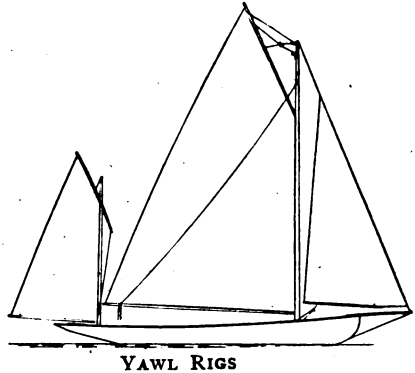

YAWL RIGS

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the mast is frequently too short; consequently the head of the sail cannot be kept in place. With jib-headed mizzens the same spar is too light; in consequence when the sheet is brought down hard the mast buckles aft, throwing the head of the sail into a bag. How frequently you see a yawl on the wind with her mizzen all a-shiver. If you make the boomkin longer, the boom stouter, and give the mast a good head, you will get a better sitting and more efficient sail.

Now let us, in order to test the qualities of short-rigged sloop and yawl, place them in such situations as they are liable to get into when cruising. First they are caught in a heavy, sudden blow with a lee shore close aboard. It is necessary to shorten sail at once. The yawl simply lowers her mainsail and, holding way under mizzen and jib, forereaches along, while the crew, having secured the boom, proceed to tie in the reefs. The sloop is in such a situation that she cannot run off; she must either anchor, lower everything and drift, or else jolly along with head sheets flowed and the peak of the mainsail up. Having a part of the mainsail drawing increases the difficulty of reefing, and if there is any sea the lowering of the sail will cause her to roll, making it bad work securing

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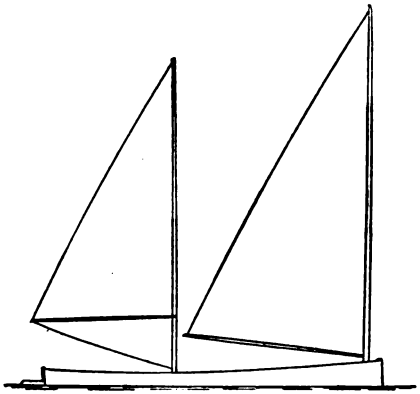
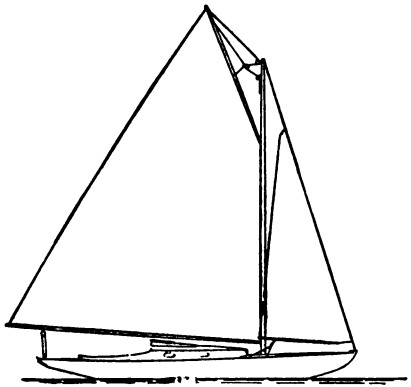


SHARPIE



KNOCKABOUT

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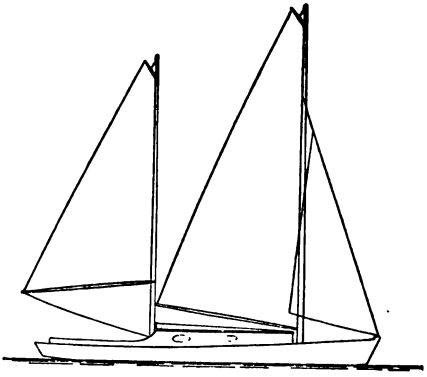
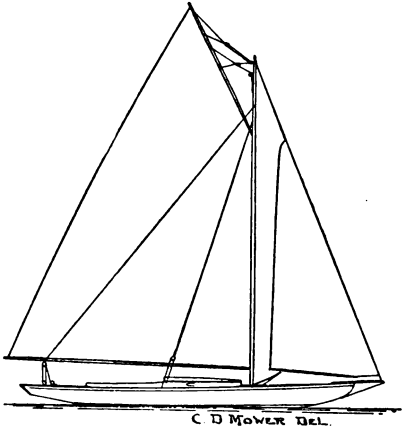


SHARPIE



RACEABOUT

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the clew. The yawl's clew is inboard, where it can be readily handled, and owing to her jib and mizzen sheets being aft she is comparatively steady.

Again, we will suppose that both these boats have come to anchor, sails stowed and awnings up. It comes on to blow, and it is necessary to shift berth to a more secure anchorage. The yawl hoists her jib and mizzen—a very easy matter—and beats up to a better anchorage. The sloop has to take in her awning, clear decks and perhaps reef the mainsail before hoisting it to follow. How many times has the cruising man remained in an uncomfortable berth because of the labor of making sail on his sloop after all has been snugged down?

Now let us suppose these two boats are running off large, with a steep sea and heavy wind. The yawl takes in her mizzen and lets her boom broad off, its short length preventing the danger of tripping. The sloop has no mizzen to take in, but it has a long boom which must be watched carefully or else topped-up. And with a strong beam wind the yawl with jib and mizzen stowed will ratch along under reefed mainsail; very few sloops will do that.

One time when coming down along shore with a yawl

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we had an unsteady northwest wind, blowing a good whole-sail breeze, with now and again tremendous heavy puffs, acting as wind off land frequently does. We made company with a sloop of about our own size, but a much faster boat. In the puffs it was necessary for both of us to let up, but the rest of the time we could carry our canvas without worrying. I put two hands on the main sheet with orders to spill the sail when a puff struck, and, keeping on my course, shivered her through. The sloop man first tried luffing out, but, losing distance by this, he resorted to starting sheet and bearing off; consequently he was all over the shop. Once or twice he had to drop his peak in order to keep control. Neither of us wanted to get offshore, as we had to haul up at the next point, so were hugging the beach rather close. At last he gave in, anchored and started to reef. We followed suit, but kept on our course under jib and mizzen, getting a two-mile lead and first home. He came aboard that evening and asked me what kind of yawl his sloop would make. As he flicked the oakum out of us the next day in a beat to windward I am afraid he didn't stay converted, but relapsed into the sloop heresy.

The ketch rig, which is very like the yawl, has all the

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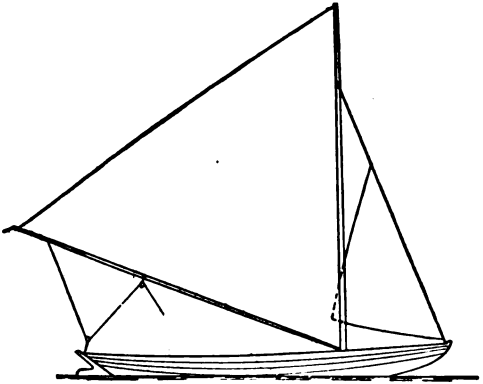
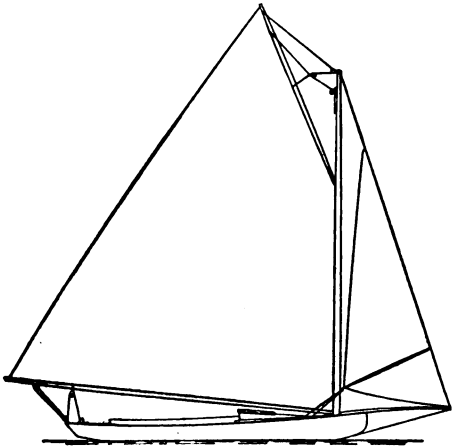


CLIPPER DORY



CAT SLOOP

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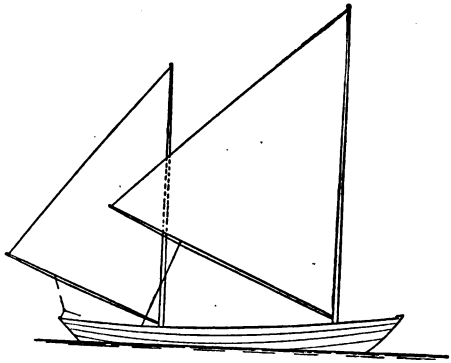
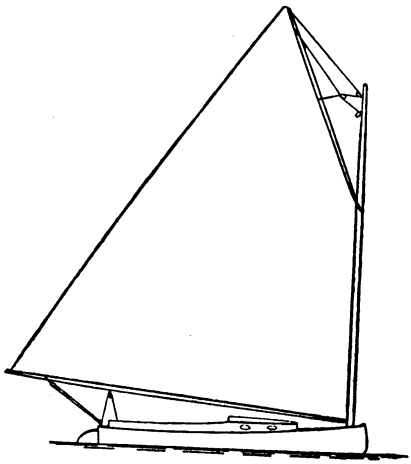


FISHING DORY



CAT

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latter's virtues and defects and a few of its own. The difference between the ketch and the yawl is this: in the yawl the mizzen-mast is stepped abaft the rudder post, and in the ketch forward of it. In the ketch this brings the mast just where it is most in the way, right at the forward end of the cockpit, generally obliging the putting of the companion on one side, or else taking the hatch well forward to the middle of the cabin. The ketch mainsail is narrow-footed, and longer on the hoist than that of the yawl. It is a very light and easy rig to handle, and for large boats is better than the yawl; and for small ones it is better than the schooner. In this country it is mostly used on shallow, flat-bottomed hulls, such as are employed in navigating Southern waters. In the British Isles it is a favorite rig for coasters, and I have heard it highly commended by coastwise skippers. Most of the sloops formerly used in that trade have been in late years converted into ketches. The most marked advantage it has over the yawl is that, if the largest sail be taken in, there is left in the head sails and mizzen a good spread of canvas; whereas, if the mainsail be taken off a yawl she is under too short sail to do satisfactory work. The

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advantage the ketch has over the schooner is in getting rid of the long main boom.

Like the catboat, if the weather were a constant quantity, the schooner would be a rig without peer. In smooth water and when she can carry her sail, especially to windward, there is no rig to equal the schooner. She has the speed and weatherliness of the sloop, with lighter and easier sails to handle. She can be shortened down without reefing, and can spread plenty of light canvas in soft winds. Her defect is the defect of all fore-and-afters, although in her case it is aggravated by having the mainmast stepped further aft—she is a bad runner in heavy water.

I have made a passage of twelve days in a schooner, during which time we never had the stops off the mainsail; during part of the time having no after-sail, and the rest of the time a trysail set. To have set the mainsail and squared off the boom would surely have brought about a disaster.

Let me here repeat some former remarks on the subject: It is often a matter of wonder to landsmen why sailors continue to use square sails, when to all intents the fore-and-aft canvas is so much easier to handle. So

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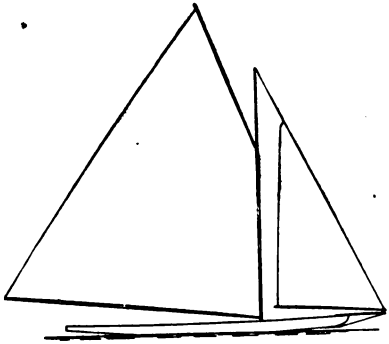
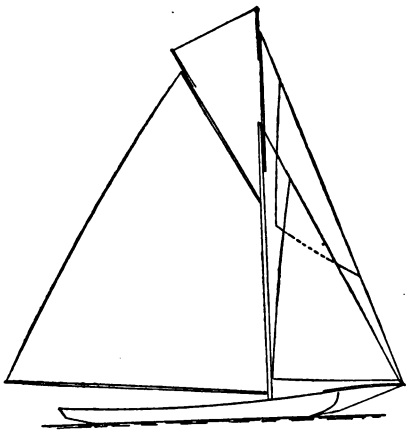


JIB AND MAINSAIL



SLOOP RIG

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it is in smooth water and under average conditions; so long as one of our typical fore-and-aft schooners can carry all sail and make progress in a windward direction there is no abler vessel afloat. But when obliged to shorten down or make a run for it, they are the worst craft in the world. So long as you can keep sail on them they will do all that a ship can be asked to do, but once they are stripped in a gale, good-bye to safety. Take a good look at an ordinary two-masted coaster, and you will comprehend at once why this is. These vessels have enormously long lower masts, and the spread of the rigging is in consequence small; their booms are long and heavy, and all the weight above deck is centered in a line over the keel. The pressure of canvas, except when the sails are winged, is all on one side, and is exerted so as to bring a twisting strain upon the supporting spars. There is not, as in the square-rigger, a balancing of weights and strains. The freer these vessels are sailing the more pronounced is this strain. The only relief the spar can find is to impart this strain to the hull, which in consequence forces the bow in the opposite direction and brings a pressure upon the helm. To prevent this action a reducing of the after canvas is necessary.

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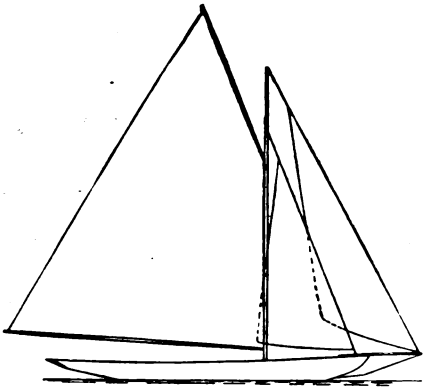
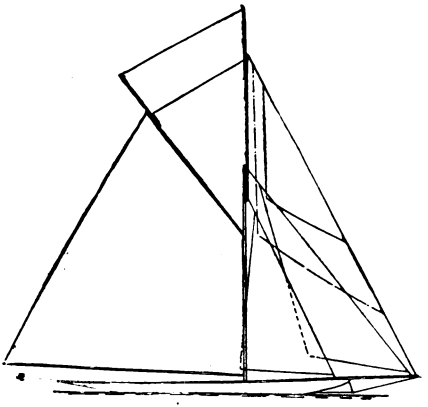


POLE MAST SLOOP



CUTTER RIG

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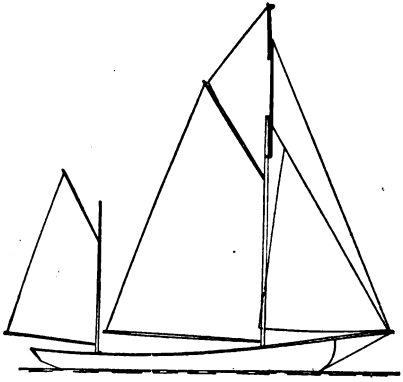
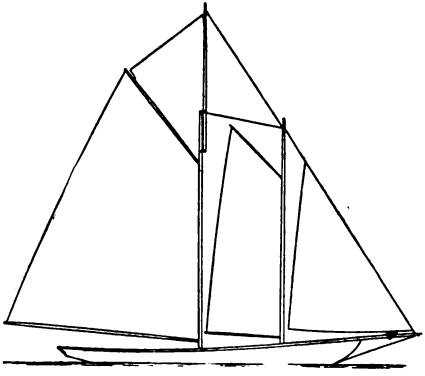


KETCH



SMALL SCHOONER

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A close study of the fore-and-aft rigs used along our coast will show what devices have been resorted to in order to remedy this defect. In the first place, there was the subdividing of the mainsail—making a three-master; then a gradual reduction of the spanker, until on many of our three-masted schooners it is to-day the smallest of the three lower sails. At the same time the lower masts have been shortened and the hoists of the topsails increased. On the great lakes the fresh-water man has reduced his spanker to almost the proportions of a ketch's mizzen, the necessity of more constant jibing having forced him to this change. But alter as you please, the fore-and-after is still a bad runner when winds blow strong and seas run high.

Our modern racing schooners are a particularly bad type. They are really large sloops with a fake foresail, this latter bit of canvas being more ornamental than useful. A good specimen of the rig proper are some of our large cruising schooners, with wide-footed foresails and short main booms. The pilot-boat and fisherman rigs are also excellent types.

In a proper schooner the foresail should be in such a position as to allow the vessel to be handled under it

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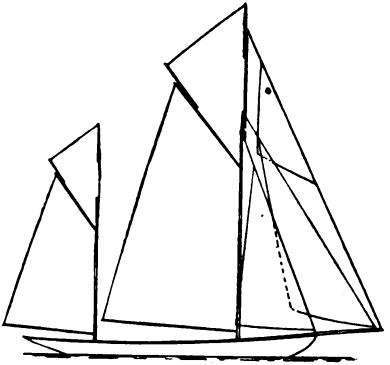
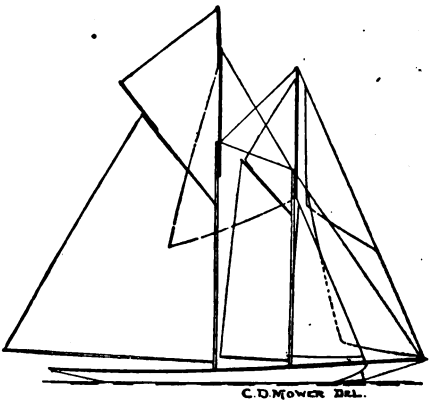


KETCH



FULL SCHOONER RIG

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alone, as it is the last sail to take off in heavy weather. It should be broad-footed in order to trim properly; you cannot trim a narrow-footed foresail so as to draw when going to windward unless it has a lug; this lug is a nuisance, as it obliges the tending of the sheet when tacking. The main boom should not go over the taffrail beyond easy reach. A forty-foot pole-mast schooner makes a very handy boat for two men to work. Her heaviest sail is lighter than the heaviest sail of a yawl or ketch of the same size This is something you must always take into consideration when choosing a rig for cruising. The average yachtsman is a man who does not do manual labor for a living, and is consequently soft-muscled. Handling sails, unless you are constantly at it, is hard labor, and if a boat is short-handed is sometimes a heavy tax on the strength of the crew. Any one who has hoisted a heavy mainsail by himself will understand this. Many a time after making sail or reefing when alone I have lain down completely exhausted.

A man who intends to employ a crew can afford to ignore this question, as he can suit his crew to his boat; but when you depend upon amateurs for help you cannot do so. One day you may have a double watch, and the

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next day nobody. So it is best to select a rig of such weight as you can handle yourself if necessary. This makes you to a certain extent independent of your friends.

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ON SAIL AS AN AUXILIARY

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"When blows the breeze we spread our sail
And save the gasoline,
But when the gentle zephyrs fail
We start the old machine;
And with a clank of shaft and crank
Go rattling into port—
And this is what, to be quite frank,
Some folks consider sport."

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ON SAIL AS AN AUXILIARY

ONE day, while standing talking to a builder, we were joined by the owner of a naphtha launch who was desirous of having his vessel rigged as a yawl, and had come to get the builder's opinion as to what the change would accomplish and cost. In response to an inquiry as to what speed he might expect to get out of the craft under canvas, the builder answered, "four miles." "Then," replied the owner in jubilant tones, "she will go eleven miles, as I get seven out of her now without any sail." He was greatly surprised, and rather suspicious of our knowledge, when we informed him that if sail increased the speed of his craft over her maximum to the extent of half-a-mile an hour, he might consider himself fortunate. Now, this man is by no means a lone bird in his belief; he shares the misconception with many launch-owners and others. Like some of our popular authors who write sea stories that are not

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sea stories, the average man firmly believes that steamships can and do sail, and it will take many years of pounding to get this idea out of the public's head. There are afloat steam vessels that can and do sail, but they are sailing vessels equipped with engines. In former times almost all ocean-going steam craft could work to leeward under canvas, but they, unlike the vessel of to-day, were heavily rigged, most of them carrying full sets of yards forward, and spreading many thousand feet of cloth. The steam vessel of this age, when put to using sail, simply drifts. Except as a check to rolling, the sails carried by steam vessels are of little use.

Now, to the question of what use is sail as an auxiliary power. In vessels of a speed exceeding ten knots, it is of little or no use, except when due to the form of the hull, or for other reasons the slip of the screw is excessive. As, for instance, in a vessel towing others, such as sea-going tugs, where the actual speed is one-half of the screw speed, sail is an aid. Again, in a vessel of bad form, when, frequently owing to the weight on the engine it is unable to run at its highest working speed, sail is an aid, as it lifts some of the weight off the engine, and allows an increase of revolutions without an in-

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crease of fuel expenditure. For this purpose, fore-and-aft canvas is of doubtful utility, the square sail being far better. But in high-powered, fine-lined vessels auxiliary sail is of no use whatever. The little that might be gained by employing it under the most favorable circumstances is offset by the retarding effect of the windage under unfavorable circumstances.

A vessel whose screw speed is eight knots and whose actual speed is six knots has a slip of twenty-five per cent. Supposing that her sail power is sufficient to drive her five knots or three knots in excess of the slip. Now, if her speed be increased to eleven knots by using canvas, it must not only take up the slip, but induce an acceleration of the engine, so as to give an additional screw speed of three knots—an increase of 37½ per cent. over the working speed of the engine. This is practically impossible. No engine is built to run at a speed of 37½ per cent. over its working speed, yet unless the screw travels as fast as the hull, it is useless. It is exactly the same thing as when trying to row a boat running under sail; unless you move the oars faster through the water than the boat is moving you do not assist in the propulsion. Reasoning from this, we may lay it down as an

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axiom, that: When a vessel's maximum speed under power exceeds her maximum speed under canvas, the use of sail in conjunction with power will not increase the speed beyond the percentage of slip.

When mechanical propulsion is the auxiliary power, we have a different problem. Take a vessel capable of being driven by sail at a speed of eight knots, and by her engines alone at four knots. Now, if she be sailing at a speed of eight knots, and we start her engine to make the number of revolutions necessary to induce a speed of four knots, the screw, not traveling as fast as the hull, will be dragged to the amount of the difference between its speed and the speed of the boat—four knots. In that the screw shall have a propulsive force it must be driven at a speed to exceed eight knots, an increase of over 100 per cent. Reasoning from this, we may lay it down as an axiom, that: A vessel whose maximum speed under sail exceeds her maximum speed under power will not increase her speed by employing sail and screw conjointly.

While auxiliary sail is of little or no value, auxiliary mechanical propulsion is. But its chief value lies in it as a substitute, and not as an auxiliary. The wind—the

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fuel of the sail—is not only a variable quantity, but frequently an absent one. A small vessel, such as are the majority of our cruising yachts, seldom exceeds a speed of eight knots, and as a general average taken through a summer's cruising do not log more than four, much of this low average is due to the hours spent in calms and light airs; and if we add the time lost in waiting for a breeze, the average will fall still lower. A yacht in sailing 100 miles in the usual summer weather takes, we will say, twenty-five hours. Sixty miles of this is made in a fair breeze in ten hours, then six hours in which she makes ten miles, leaving nine hours in which to make the other thirty.

60 miles 10 hours.	6 miles an hour.
10 " 6 "	1 2-3 " "
30 " 9 "	3 1-3 " "
Average for 100 miles,	4 " "

Let us suppose that a similar craft is fitted with a motor to drive her at a speed of five miles an hour. She voyages 100 miles, the first sixty in ten hours. During the doldrums she uses her power for six hours, and makes thirty miles, and in sixteen hours has covered ninety miles against the sail yacht's seventy. Having

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made the distance at an average speed of 5⅝ miles, she is within sight of her port when the other is thirty miles off.

Last summer I ran thirty-eight miles in fourteen hours in a small sloop. Thirty-two miles of this distance was made in eight hours, the remaining six miles taking six hours to cover, and if you analyze a set of cruising runs you will see that mine was an exceptionally good performance. I usually, in cruising, figure on making an average of three miles, thirty miles being a fair day's work and forty a good one, while a fifty-mile run is possible only once or twice during the season. This is in a boat whose maximum speed is seven knots.

I have not the slightest doubt but what a man with a yacht fitted with a motor capable of driving her at a speed of five miles, and using the engine only as a substitute for sail when the wind is dead or fickle, could cruise twice as far and see twice as much as one who depended solely upon canvas. This is a deal to promise, but no doubt those who have had a long experience in cruising in our Eastern waters will underwrite the opinion.

But while auxiliary power has its advantages, it also has its disadvantages. It increases the expense; it takes

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up room in the boat; it is noisy, and, to a certain extent, disagreeable, due mostly to the use of a fuel which is not equal, odoriferously speaking, to genuine wood violets. But its chief drawback is that its use tends to make cruising less toilsome and hazardous. Like all modern

> "Inventions that save our seamen's lives,
> And murder the breed of sailor men,"

its effect is to discount skill and pluck, to take away from voyaging that uncertainty which is the chief charm of the cruiser's existence. The fact that you leave port with a certainty of getting to your destination on time, barring accidents, makes somewhat monotonous an event that otherwise containing a large element of chance induces a corresponding degree of excitement. There is probably no pastime so tiresome to an active man as steam yachting, especially if it be in familiar waters. A steam yacht is a lazy man's palace and an active man's prison. Except when there is a race or a difficult bit of navigation, I would as soon run a trolley car as a power boat. But, then, happily for the world, we are not all taken off the same molds. Many men yacht for pleasure, and find such pleasure in idleness. I don't. I find my pleasure in physical exertion, and in opposing what skill and

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knowledge I may possess to the task of getting the better of the elements. But as age and rheumatism tighten their grip, my heart is being gradually weaned from the sail, and I find myself thinking seriously, if, after all, it will not be better to have a little power under the deck to fall back on at certain times.

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ON REEFING

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Precaution is the mother of safety.

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ON REEFING

THIS is a short chapter on a short subject, but one that is of interest to the green hand. Men often ask when it is time to reef? It is always time to reef when you think it is. The moment you would feel easier and your boat handle better by having less sail spread, is the time to shorten down. Never mind what anybody else is doing or what anybody else tells you. It is your boat, not some other boat that is worrying, and yourself, and not some other person, who is in charge. Never carry sail for the sake of carrying it; the ignorant may praise your recklessness and pluck, but the experienced man will call you either a lubber or a fool.

Never let the action of another guide you in this particular, unless the action agrees with your own judgment. It is very common for young sailors to reef or not reef as they see some other man, and consequently to carry sail much to the risk of their vessel and lives. You must

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remember that these remarks of mine have nothing to do with racing. In racing, a man cannot reef when he wants to, but when he can; therefore, he frequently carries sail when he would give a good slice of his daily income to have it off, and often keeps in his reefs when he would like to shake them out, but does not for the same reason. Then, again, in racing, boats are always in company, and if an accident happens someone is close aboard to give assistance; but in cruising this is not so, and many a life has been lost for want of a reef in time.

When I was young and fresh I had an idea that if anyone could carry sail on a boat I could do the same. One day I had a lesson that made me think, and partially cured me of the habit. I went with a clever old boatman across the Sound to bring home a new cat. We each took a crew, and, to return, he sailed the new boat, and I the one we had come over in. Halfway across it came on to blow very hard, and it was all I could do to keep my boat on her feet. My crew wanted me to stop and reef, but as the new boat kept on, I insisted upon following her, being afraid that the old man would laugh at me. In plain talk, I was afraid of being thought a coward, and for this I jeopardized my own and the lives of the

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other boys. When at last, after a struggle and half full of water, we reached port, the old man met me with a torrent of invectives, calling me a fool and several other hard names for not reefing.

"But you didn't reef," I protested. "Reef!" he exclaimed. "No, for I couldn't; but I'd given fourteen dollars if I could have got that sail down. Do you think I was carrying whole sail for fun?" It seems the halliards, being new, had jammed, and they could not get the sail down, so had to lug it. This taught me a lesson, one that I have never forgotten; and oftentimes when I see a man struggling along under too much sail, I wonder if he, like the old boatman, wouldn't give fourteen dollars if he could get that sail down.

The first thing when you get a crew is to break them in to a method of reefing. Give each man a place and teach him to keep it; this is the secret of rapid and efficient work. Let us suppose that you are in command of a small sloop, with a total crew of four. It comes on to blow, and you decide to reef. There is a bit of lee under the shore, and you go in for it. Now you have decided to reef without anchoring, and when close enough luff up and prepare to lower the mainsail. Your

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mate, your best hand, and the man in his watch go to the halliards, you stay at the helm and your watch-mate takes the sheet.

Now, if you lower the mainsail all the way down, you will have to take in your headsail and drift; this will soon take you out of your kindly lee, but if you can keep some after-sail up, with the jib on an easy sheet, you can jolly her up to windward a bit and keep close inshore. Having decided on this you order the sail lowered down to the reef. The getting down of the sail quickly depends on your cleverness at the helm; you must spill just at the right moment. As the sail comes down your two men handle and lay the sail along the boom, the mate tending the halliards. When the tack cringle is low enough he belays the halliards and ties down the tack. By this time you have the pendant ready, and when the mate shouts "All fast," you haul out, one man helping you and the others shaking and lighting out the canvas. When this is handed out and made fast, the hands begin to tie the points, beginning in the middle and working forward and aft.

Your business is to look after the dog-ear, to tie in the outboard points, and pass a lashing round the clew,

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wrapping it round the boom. The points are passed between the foot of the sail and the lacing, not between the lacing and the boom, a common error with green hands. Tie your points with a square bow knot; don't tie them too tight; try and put the same strain on all. Don't haul out your clew too hard, especially if it is raining or the water is flying. The pendant will shrink one way, the sail the other, and in consequence the canvas be pulled out of life. As soon as all the points are tied, look them over carefully to see that they belong to the proper reef, and are not tied cross-faced, and, if correct, hoist away.

Lazy-jacks on a boom are of great assistance in taking a sail in, but they are in the way when reefing. Quarter-lifts as substitutes are better for small craft. The reef points should be made of different kinds of stuff, or else be dyed different colors, so as to be easily distinguishable. I prefer different kinds of stuff, as they can be told by the feel at night. The first reef being cotton line, the second manila, and the third cotton.

If you are going to tie in more than one reef, it is best to tie in the first, then the next over it, and so on. This also makes a much neater looking job. Teach your men

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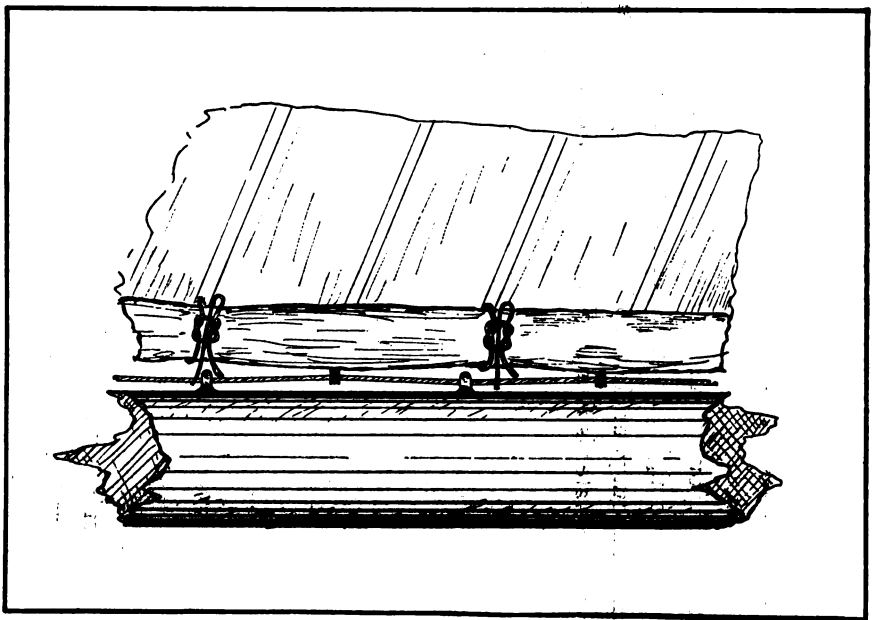

THE PROPER WAY TO TIE REEF-POINTS

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to roll the sail up tightly before tying in; nothing looks so bad as a reef made up of a series of bags.

If you are caught out in the open, and have to reef, it is best to lower all down and reef running off; by getting the boom firmly lashed amidships you can handle the sail, whereas if you lay-to the sea will make trouble. In running off carefully tend your helm, and keep the vessel moving, or you may get pooped. If anywhere near shore it is best to go in, anchor and reef in quiet, and at your leisure. The methods of reefing a sloop are the same for reefing a cat, but if you have a yawl, ketch or schooner, the work is much more simple and easy.

Always, when anchored in an open roadstead, or in any place where you may have to get out in a hurry, reef your large sails before turning in. Then, if it comes on to blow in the night, you are ready for it. If you expect a squall to hit you, in a place where you cannot anchor, reef down, and do so in plenty of time. Before leaving harbor, if there is any question of weather outside, reef and carry them out with you, until you get the heft of the breeze; if it is lighter than you expected, it is a simple job to shake out.

Reefed jibs are not much use; they seldom work well,

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and it is far better to shift headsails than to reef them. The jibs should be snap-hooked on the stay; in this way they can be quickly shifted. Reefing on a bowsprit in a seaway is a difficult and dangerous job. I shall speak further of this matter of head-sails in another chapter.

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ON ANCHORS AND ANCHORING

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"Let's forge a goodly anchor—a
bower thick and broad;
For a heart of oak is hanging on
every blow I bode;
And I see a good ship riding
all in a perilous road—
The low reef roaring on her lee; the
roll of ocean poured
From stem to stern, sea after sea;
the mainmast by the board;"
The bulwarks down; the rudder gone;
the boats stove at the chains;
But courage still, brave mariners—the
bower yet remains!
And not an inch to flinch he deigns—
save when ye pitch sky high;
Then moves his head, as though he said,
"Fear nothing—here am I."

—FERGUSON

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ON ANCHORS AND ANCHORING

ONE of man's oldest, simplest and most perfect instruments—the anchor. Like all early inventions, it obtained its present form by a slow process of evolution, and, as is the case with nearly all implements of the same nature, it is to-day to be found in use in every step-form which during the gradual process of development it assumed. The primal anchor of stone is still universally employed, its immediate successors, the stone-weighted net and log, are yet in use in the East, and iron forms that might have found their shape under the hammer blows of the sinewy Sidonian smiths still swing from the bows of vessels plying the Indian seas.

As to who first forged anchors of iron there is some doubt, the ancient historians disagreeing on this point with amiable unanimity that characterizes all their statements

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in regard to the origin of things, both animate and inanimate. The balance of evidence appears to favor the Phrygians, a people of Asia Minor, whose most celebrated king, Midas, is well remembered as the avaricious monarch who had the unfortunate experience with gold, as related in a yarn which probably originated in the imaginative brain of some ancient free-silver orator.

But whether these people or their contemporaries, the ingenious, rich and daring Phoenicians, first forged it, there is no question but what iron anchors were originally used by the maritime nations inhabiting the shore of the great tideless sea. The anchors were, as I have said, of stone and of wood weighted with stone and metal, such as are still used by the Chinese and Malays. It is easy to see how from the latter came the shape of the anchor of to-day. From the use of a straight balk of timber to one with a crook is a natural step. It is much easier to lash a stone to a crook of wood by placing it between the trunk and branch than it is to lash it to a straight stick.

Evidence favors this as the step of progression; the first iron anchors having but one arm and no stock; being simply the wooden crook reproduced in metal. The

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next step was to add the bill or point, which very readily took its shape from the spear of that day or the spade, both of which implements were arrow-shaped. The next step forward was the adding of the second arm. The arms of ancient anchors were straight, not curved, as are the anchors of to-day. The curved arm being very modern. With the stock added, when and by whom it is not known, the anchor of the ancients continued to do its duty until early in the last century, when an Englishman named Pering greatly improved it by curving the arms and strengthening the crown and shank. At the same time the trip-hammer came into use for forging, allowing of a far more perfect welding of material than could be secured with hand-swung sledges.

In order to understand the action of the anchor, which is perfect, it is only necessary to take the common pick, such as is employed by laborers in breaking up earth, and drive it into solid ground. Drive the arm of your pick right to the helve; now pull on it at right angles to the arm. You cannot move it; nor could the strongest man; simply lift the handle up and the arm will come out of the ground easily. Such is the action of the anchor. Is anything more simple or perfect?

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When out ahead this small arm will hold a great ship against wind and tide; when brought under foot it is broken from its hold by half a dozen men. An anchor weighing 2,000 pounds will hold a ship weighing 5,000 tons, yet when brought to such a position as will permit of its being tilted up it can be broken-out by an engine of five horse-power.

Since Pering's day many improved anchors have been patented; of these only two, the Rodgers and Trotman, are of any account. Of what are called "patent anchors," that is, anchors of peculiar shapes, there is this to say, they are inferior to the original form. The only argument in their favor is that they stow easier, and it is for this reason that the stockless variety is employed on steam vessels. This form can be hauled directly into the hawse pipe, thus doing away with the labor of catting and fishing, but they will not hold with the old form, and need a much longer scope of hawse. I have experimented with several of those built for yachts and have in every case found them inferior to the common anchor. They are useful sometimes as stern-holds, and for dropping on ragged bottom, where a common hook is liable to foul.

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For use where a vessel is anchored in a current, and is apt to be tide-rode, the Trotman is excellent. The peculiarity of this anchor is, that the arms are pivoted so that the fluke of the upper arm when the hook is biting is down on the shank; this prevents the hawser from fouling and upsetting the anchor if the yacht happens to ride over it.

The average yacht anchor that is found on sale is an instrument that could be largely improved without adding to its cost or weight. A better distribution of the metal would add much to its value, but its worst feature is the method in which the stock is secured in the head. These pins are always a nuisance, frequently working out and more frequently being lost. There are anchors made in which the stock screws in, and others in which the stock passes through a slot with a lug, which, on being turned, engages with the side of the head, preventing its slipping back. Both these are better than the pin. Every yachtsman knows what it is to find the pin missing just when it is wanted and wanted in a hurry, and to have to substitute a nail or a penknife blade. There is a small fortune for the man who will bring out an anchor with a stock

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that can be shipped and unshipped quickly, and yet stay fast when down on the bottom.

The strain on anchors when holding a vessel is nothing like what it is commonly supposed to be. If it was how could a vessel be drawn up to her anchor? It has to blow very hard when a man cannot draw a small yacht up to her hook. The reason of this is, that the windage of an anchored vessel is a comparatively small surface, so long as she lies head-on. It is the sum of the area of the widest section of the above-water hull, and the area of the rigging and spars, found by multiplying their diameters by their lengths. This is, as I have said, a comparatively small surface.

In a strong blow, such as yachtsmen generally describe as a gale, the wind pressure is only about five pounds to the square foot, while in an ordinary breeze, such as usually blows in summer, the pressure is scant of a pound. So that a boat with a hundred square feet of windage would, in a yachtsman's gale, only be forced back by a pressure of 500 pounds. Some day, just for your own enlightenment, take a spring scale and put it on your hawse when the yacht is riding to a wind with no sea on.

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One day my boat was lying in a tide running at a rate of one mile. The bottom was a medium hard gravel and the water perfectly clear. In turning tides she had capsized the anchor and it was lying stock up and flukes flat. This anchor, weighing thirty pounds, by its weight and friction of the stock end on the bottom kept the boat stationary. Her displacement was just over four tons. The anchor was simply resisting the friction of the tide on the immersed hull. Reverse this and it shows how small is the power necessary to drive a vessel one mile an hour.

The direct strain on anchors is of no consequence except in very high winds; it is the sea that causes them to leave their hold. Go back to our pick for an explanation. When given sufficient scope the anchor, like the pick, is resisting a pull at right angles, and stands fast, but the minute the sea begins to move the vessel up and down the handle of the anchor is worked up and down; the shorter the scope the more surely is this motion transmitted, and the more effective is it in breaking-out the arm. To prevent this in a heavy sea we resort to a practice called backing.

The object of backing an anchor is to prevent this up

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and down motion from passing from the vessel to the anchor. In order to do this it is necessary to weight the cable, so as to prevent its lifting from the bottom, some distance inside of the anchor. This is done either by leading the cable through another anchor or by weighting the cable with ballast. The last is the better method, as it can be done from the vessel without disturbing the hawse.

I find that few yachtsmen make a study of anchoring; mostly because they anchor in places where there is little to be feared either from wind or sea. It is only when they get into harbors where both are to be dreaded that they learn this part of the trade. To show how universally careless we are in this respect it is only necessary to recall the disastrous effects an unexpected summer gale has upon a fleet of our yachts. In August, 1893, a storm of this character swept the Eastern seaboard, and some eighty yachts were driven ashore and many of them totally wrecked. In the summer of 1897 a moderate gale came on the coast, and out of a fleet of some thirty yachts anchored and moored about the boat I was in, twelve went adrift. The same day, in and around Boston, the storm played havoc with the pleasure fleet.

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Another time we were caught off the Thimbles in Long Island Sound in company with a small fleet. Everything dragged and several were only saved by a lucky shift of wind from going on the rocks. Many of these boats had no spare anchors; some had the anchors and not sufficient cable; others had ground tackle much too light for their bulk. Few of the crews knew how to properly use what they did have. I was in a 30-foot sloop of the old flat type, an exceedingly bad sea boat. We rode it out with two anchors and 300 pounds of ballast down ahead, but it was only by judicious management, and the addition of a new mainsheet to our scanty length of cable.

Every boat should carry two anchors, and every boat that cannot readily make fast to a dock, three. The weight of anchors to be carried can only be approximated, as it depends largely upon the build of the vessel, the extent and prevailing conditions of her sailing waters and the service engaged in. A boat that is only used for day-sailing that finds shelter at night in a safe harbor and moors or makes fast, needs but light ground tackle. She can get along with an anchor weighing a half-pound to

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each foot of over-all length, and need never to resort to her spare hook except on extraordinary occasions.

Narrow deep boats with sharp entrances are very light on their ground tackle and do not need nearly as heavy anchors as do broad shoal boats. Our modern full-bowed boats are very hard on all kinds of gear, and need especially heavy anchors and cables. Flat-bottomed craft, like sharpies and scow houseboats, are the hardest of all, and your hooks and hawsers can't be too heavy to make sure of holding them. High-sided and high-housed yachts are also hard riders, the windage having a tendency to keep them worrying at their hawse. All these things must be taken into consideration when selecting a weight of anchor and a size of cable or chain, but, as it is always best to err on the safe side, be less afraid of getting too heavy gear than of getting too light. A 20-foot boat will hold to a ten-pound anchor, if the hook is well proportioned and takes a good hold in good ground, but I should not feel comfortable in turning in on a rough night with only that weight of iron out ahead of me. An old fellow, who is a bit of a crank on the subject, once took me to task for carrying such heavy anchors and cables. To his mind they were totally un-

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necessary; ones half the weight and size would do as well. He used a twelve-thread line and an anchor about vest-pocket size on his boat.

His argument was good from his side of the deck, but things had a different aspect from mine. In the first place, he always anchored where he wanted to, but I, being a roving bird, had frequently to anchor where I did not want to. In the second, if I turned in to sleep I had to do so feeling sure that my boat would be in the same place the next morning, or else I could not sleep peacefully. Again, a small line is awkward to handle and is easily chafed through; these are things to be considered as well as strength. The breaking strain of a cable used should always be at least four times the weight you expect to put on it. It is to the extra factor of safety that you must frequently trust for the odd trick and the game.

A heavily-built cabin craft, or a yacht loaded with lead on the keel, needs an anchor at least a pound weight for each foot of her deck length. This is for a regular stand-by, something to be used whenever she comes to a halt. Such weight will, under all ordinary conditions, give sufficient hold, admitting that the bottom is suitable for

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anchoring. I have seen a 25-foot cabin sloop hang to a twenty-pound anchor in a gale of wind, in a place where there was no sea to bother her. But the sea is what troubles the anchor, not the direct strain.

A yacht of 40 feet, used for cruising to distant ports and anchoring here, there, and everywhere, should carry four anchors. Of course you can get along with less, perhaps, for many seasons, but to have peace of mind and absolute security, you need four. Two of these anchors are for constant use and the other two for special work and dangerous emergencies.

The two first are what are called on large vessels bowers, being the anchors hung at the bows, but we will sometimes speak of them as stand-bys, they being the instruments always ready for use. The third is a light fellow, exceedingly useful when needed, called a kedge. The fourth is the big-weight, whose services are only called upon as the last resource, and who passes the bulk of his days in idleness below—he is called the spare.

The stand-bys for a 40-footer should weigh together twice the boat's length in pounds—80 pounds. This can either be evenly divided or unevenly, as you see fit. I prefer to divide the weight unevenly, having, say, one

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thirty-five and one forty-five-pound, or one thirty and one fifty-pound. These anchors should be galvanized and be uniformly strong throughout, the large one being of heavy shank and broad palm; the smaller, lighter in build, with narrow palm and sharp bill. This lighter anchor should always be ready for service under the bowsprit or at the cathead.

On a cruiser the heavier stand-by should also be kept ready to shackle to the chain or bend to the hawser. It need not be kept hanging under the bowsprit or at the cathead, but can be lashed on the fore deck, so as to be available for instant use. I remember once going ashore because the owner insisted upon having the second anchor unshackled and stowed below; his reason being that it made the boat look untidy forward. When we rounded-to and let go the small one, the chain parted, and before the other could be brought on deck and bent on we were blown on the beach.

The spare anchor is kept below, but not, as in most boats, in a place where you cannot get at it without hauling over a mass of dunnage. One time, when anchored in an open bight, we were joined at sunset by a large sloop; she letting go outside and to windward of

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us. During the night it came on to blow very hard, and at daylight we were riding to both anchors with a full hawse ahead. The big sloop was dragging badly, and, in response to their calls for help, I took my crew and went aboard her. She was in charge of her owner and three other amateurs. They had let go both her bowers and all the chain, but they failed to hold the yacht and she was slowly going for the beach.

As soon as I got on board I asked if they had a spare anchor. The owner, who had just bought the boat and was taking her home, after a little thinking, said he thought it was mentioned in the inventory, but he had never looked to see. Taking my two hands I went below to the usual place and began a search. We pulled out sails in bags and sails out of bags, awnings and stanchions, old mops, holystones, rope, brooms, deck cushions and the devil knows what, before finally the spare hook was brought to light. Into a cabin, that looked like a South street junk shop, we at last lugged it and its cable, and from the looks of both, decided it was their first call to action. That as may be, when once overboard they did yeoman service and held the sloop in safety. I did not fail to read the owner a lesson on how not to keep

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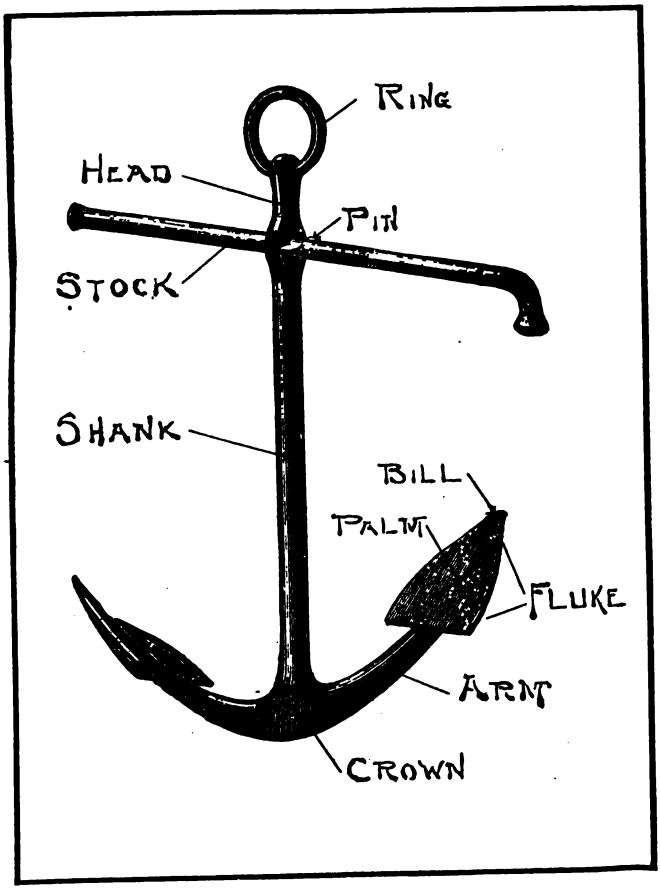

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his reserve ground tackle, and I guess the job of putting the dunnage back helped to impress it on his mind.

The spare anchor occupies but little room if properly stowed, takes up the work of the same weight of ballast, and is a harmless but exceedingly useful creature. It inspires a feeling of safety that more than pays for its keep. This anchor should always be used with a hawser, and a long and stout one, and to make assurance doubly sure, should be fitted with three fathoms of chain and a stout ring to which to bend the rope. You can either have the chain permanently attached to anchor or hawser as you prefer, but keep both where the ends can be readily laid hands upon. The best place to stow it is aft under the cockpit floor, placing it in such a way as it will lie snug and not get adrift, no matter how the boat pitches or heels. If your compass is over it, you had better see that the placing of it does not affect that instrument, and if so, how much. Frequently compasses are thrown into error by the keeping of anchors and awning stanchions under the cockpit floor.

The fourth anchor—the kedge—is a most useful piece of furniture. Being light and easy to handle it can be kept on the bows when racing or cruising. If it falls

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calm it is there to let go and hold you; if you go ashore it can be at once run out with a line to haul off, and if you miss a mooring it will enable you to hang on until a line can be carried to the buoy. It is useful when coming-to at a dock or when finding a berth in a basin or slip; light enough to be thrown over anywhere you can anchor by the stern or head with equal facility. Having it allows you in racing on tender trimming craft to keep the stand-by anchor below out of the way and where it will interfere least with the trim of the boat. Heavy weights hung on a boat's nose do not improve either its speed or its bad weather qualities. To a cruising man a kedge is invaluable; I would as soon be without my compass as my little hook. In boats under 35 feet the kedge takes the place of the smaller bower and performs its duties.

To give good service a kedge must be a properly designed kedge, not simply a small anchor. The proper kedge is what is known as spider-built—long arms, long shank, long stock and narrow, sharp flukes. It is difficult to get these ready-made, but the shipsmith will make you one. The best substitute for a genuine kedge is the seine anchor.

Now what is the best to use with these anchors—chain

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or rope? With an anchor like the stand-by, chain is best for all boats that have a place to stow it. Chain is more lasting, less dirty, and takes but little room in comparison with the same length of rope. Hawsers are always in the way, no matter how neatly they are coiled down. Besides they are expensive, owing to their short lives. In bad weather you cannot well keep them on deck, and they are wet and disagreeable cabinmates.

For the kedge a long light line should be used, something that one man can readily handle. It is best to have it in two parts; one part being kept stowed away and the other always bent. Then you have less of a coil on deck or in the bow locker, but have, by bending on the second piece, a length that will enable you to kedge off or on to advantage.

For the spare I prefer, and so will any man who has experience, a hawser. In heavy weather a boat will ride much easier to hemp than she will to chain; no matter how much of the latter you may pay out, she has the weight to lift every time she takes up the slack, and consequently rises slower and falls quicker. Hemp, until it gets well soaked, puts little of its weight on a riding vessel, and besides the give of the slack it stretches in itself.

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But whichever you use, be sure and have plenty of it. Remember this: that the first and all-important thing in anchoring is SCOPE.

One night, not long ago, we wanted to anchor a yawl, as it was calm and the tide setting us away from our port. My companions let the anchor go without first sounding; it ran to the bitter end of the chain with no bottom. As the chart only gave 15 fathoms I was rather surprised and supposed I had miscalculated the yacht's position, but, as my bearings seemed to be correct, I overhauled the chain. How much chain do you think was on that anchor? The boat being an old-fashioned plumb-stemmer, 32 feet on top. Just 10 fathoms. Gaze on that—10 fathoms of chain to anchor a boat of that size. Why, to make it hold in a breeze of wind you would have to be in eight feet of water.

The former owner, who was responsible for this, was a man who never went ten miles from his home port, and I should judge knew very little about vessel handling. There are hundreds of other boats in just the same fix. And still we wonder why yachts blow ashore.

Now, as we are through with the anchors, let us bear-off for a bit and tackle the subject of anchoring, which

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is the art of using them. Let me here remark that in all my experience I never had anchors fail to do their duty, when properly used and attended to, and that every scrape in this line that ever I got my boat into, was due to my own carelessness or laziness or somebody else's. I have had hawsers part and chains break, and I have broken arms of anchors and have lost them altogether, but in every case the accident was avoidable if proper forethought and precaution had been used.

If you are rather new at the business, or have hands forward that you cannot rely upon, when making port have the hook cleared away early in the game. Then go forward and see that all is in order. When she comes to let it be at sufficient distance to leeward to kill all way before she reaches the selected berth. When stopped dead give your order to let go. Then comes in the judgment as to how much scope she needs. Whatever the decision, always lean to the side of more than less.

Before anchoring in a strange place consult the chart, and know the bottom, depth, and fall of the tide, also its present height; this is of especial importance in places where there is a big rise. In light weather, for a short

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stay, six times the depth is sufficient; that is, in six feet of water give her six fathoms of cable.

If it is blowing hard and a sea running, before letting go, if you are using a hawser, range a good length of it on deck clear for running out. Get a good turn round the bitts and after the hook has taken hold slack away handsomely, but at the same time keep full control. Let her take it out; don't give it to her. When the hawser has a lead that enters the water well ahead, make fast, and watch how she rides to it.

You can tell by feeling the cable whether the anchor is biting or not. If it continues to drag and drags rapidly it is probably foul; if it drags slowly it is most likely bad bottom; your chart will tell you what kind.

Never drop without first taking a range, either on shore or on a nearby vessel, for not only will it tell you if you are dragging, but it is the only sure way of locating an anchor if you lose it. The way to tell if you are dragging at night or when you cannot get a range is to drop the lead overside with a slack line; if she drags the line will trend out ahead.

If your hook drags badly and you have sail on, get it up, and do the act over again. If you cannot, why then

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heave in rapidly on the first and when under foot let go your second. Do not, if you possibly can help it, let go the second while the foul anchor is out ahead, for if it should stick it will put you in the predicament of having an unreliable hold at the end of your longest cable.

If the first anchor drags because the bottom is bad holding, then shorten up, let go your second, and pay out on both. If she still continues to drag get up the spare, and if you can, heave in on both to half-hawse, and then let the spare go. If she goes on dragging you have two hopes and one alternative. One hope is, that the weather will let up; the other, that as she drags she will get into better holding ground; the alternative I will attend to in another chapter.

Many accidents are the result of haste and carelessness, when letting the hook go. A mate of mine once let the anchor drop without fitting the pin in the stock; it came on to blow in the night and we dragged down on another yacht. Dropping the hook while a vessel has headway on is another cause of anchors being foul. Frequently in small yachts carrying the hook under the bowsprit, the fluke will catch on the bobstay; instead of hauling it up and clearing it, a lubber will let the stock drop down and

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then lift the fluke up and let all go. What is the consequence? the arm falls across the cable and you have a foul anchor. Twice in my life I have had men anchor the boat on the bobstay. This happened at night and through my not going forward and looking to things myself. Instead of, like the unfortunate Wentworth, exclaiming: "Put not your trust in princes," let me cry, "Put not your trust in amateurs," especially coming to anchor at night. But the most frequent cause of mishap is in giving either too little or too much scope. Laziness stands impeached of the first, and over-caution of the second.

Before turning in, if the weather looks at all dubious, but not threatening enough to warrant your going to the trouble of sending off another anchor, you can secure yourself from a sudden attack by these means. We will suppose you are riding to your heaviest bower. Down the second bower under the fore-foot, being careful to see that it falls clear, then take the end of your hawser from underneath the coil, and take a round-turn round the mast, securing the end with two half hitches over the standing part. See that it renders freely from the top of the coil. Pass it through either the chock on the bowsprit or the chock on the rail. If the yacht drags she will

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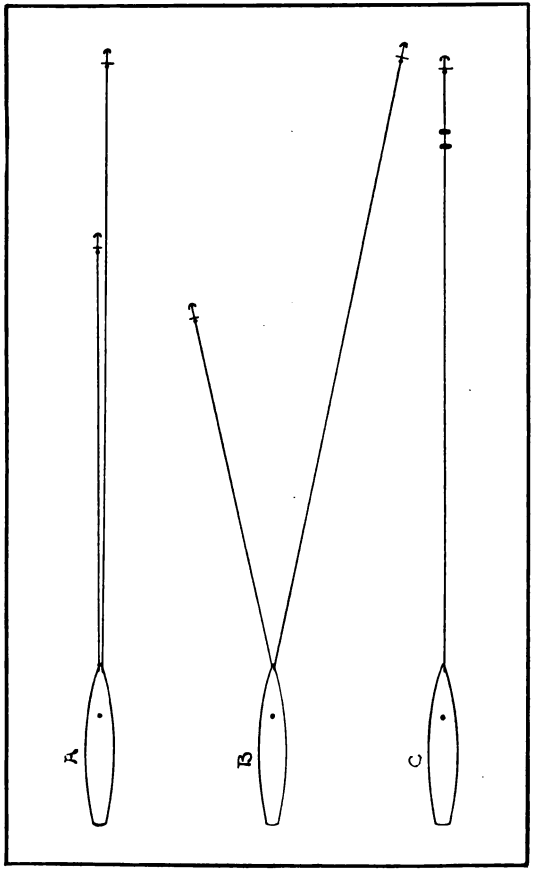

HOW TO ANCHOR WITH TWO HOOKS DOWN
A is the right way; B the wrong way.
C shows anchor backed with ballast.

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carry out the hawser and fetch-up when the end is reached. If you are using chain see that it is clear for running out. By employing your second anchor in this way, you will prevent fouling hawse if the yacht swings with the tide or wind.

Backing an anchor is done in several ways, but as it is only done in extreme cases you are generally obliged to do it the best way you can, using such materials as are at hand. Take two or four pigs of ballast, wrap them securely with a strong small line, and put on a shawl-strap handle over the chain and let them slide down with a small line attached to prevent their working right out to the anchor. A small piece of chain is better than rope to use on a chain hawse. If you can heave in you can lash the ballast to the chain, and then pay out again.

Backing is usually done at the last call, and as it is wet and dangerous work on a small boat's head when she is pitching with a sea, the job is a hurry one and is frequently bungled. By putting a line on the ballast you can recover it if the lashing parts or frets through.

A trip-line is made fast to an anchor with a clove hitch round the crown, and either buoyed or led on board. If led on board, it should be stopped down to the heel

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of the shank with a rotten stop and belayed with plenty of slack.

Now I am going to give you ten rules for anchoring, but be pleased to remember that these rules are not fixed laws, and as such do not bind you to do anything against what judgment, experience, or a present difficulty may suggest.

1. Never drop an anchor until you have first examined it.

2. Never drop an anchor stock down.

3. Never drop an anchor from the bows while the boat has headway, except for the purpose of preventing her going ashore or into something.

4. With the wind and sea ahead give any amount of scope.

5. In a tide-way give just sufficient to hold, no more, unless the conditions of wind and sea oblige a long lead; then watch your hawse when she shifts tides.

6. When getting underway in a strong wind, do not shorten too much before everything is ready aloft; same when surrounded by other vessels.

7. Be sure when you make fast, that you make fast. Always weather-bit your hawser before turning in. Don't

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make fast over an old set of turns when you shorten hawse. Always keep your riding-bits clear of everything but the hawser.

8. Always examine the gear before leaving the yacht or turning in. If she is riding hard, feel if she is fast or dragging.

9. Keep your hawsers or chains leading free of the bowsprit rigging. Look out for chafing and freshen the hawse frequently.

10. Never anchor on rocky bottom without a trip line.

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WEIGHT OF ANCHORS

Length	Kedge	1st Bower	2d Bower	Spare
20 feet o. a.	10 lbs.	20 lbs.	———	30 lbs.
25 " "	10 "	25 "	———	40 "
30 " "	15 "	30 "	———	50 "
35 " "	15 "	40 "	30 lbs.	60 "
40 " "	20 "	45 "	35 "	80 "

These weights should be (excepting kedge) increased 25 per cent. when anchors are for use on a broad shoal model, and can be decreased if model is very sharp and the hull light. There is no advantage to be had by decreasing the weight of the spare in any case. Anchors are seldom forged to weigh exactly the above weights, but the matter of a few pounds either way will not effect the service.

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SIZE AND STRENGTH OF CHAIN

Size	Average Weight Per Fathom	Proof Test	Average Breaking Strain	Suitable for Yacht	Size of Anchor
Inch	In Pounds	Tons	Tons	Tons	Pounds
3/16	3	1/2	7/8	1 1/2	20
1/4	4 1/2	3/4	1 1/4	2	30
5/16	6 1/2	1 1/2	2 1/2	4	50
3/8	9	2	4	8	75
7/16	12	3	5 1/2	18	100
1/2	15	4	6 1/2	30	150

From Catalogue of A. S. Morss, Boston, Mass.

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SIZE AND STRENGTH OF HAWSERS

Size in Circumference	Size in Diameter	Weight of 100 Fathoms Manila in lbs.	Breaking Strength in lbs.	Number of feet in 1 lb.
6 thd.	$\frac{3}{16}$ in.	12	540	50 feet,
9 "	$\frac{1}{4}$ "	18	780	33 " 4 in.
12 "	$\frac{5}{16}$ "	24	1,000	25 "
15 "	$\frac{3}{8}$ "	30	1,280	20 "
1¼ in.	$\frac{7}{16}$ "	37	1,562	17 " 8 "
1½ "	$\frac{1}{2}$ "	46	2,250	13 "
1¾ "	$\frac{9}{16}$ "	65	3,062	9 " 3 "
2 "	$\frac{5}{8}$ "	80	4,000	7 " 6 "
2¼ "	$\frac{3}{4}$ "	98	5,000	6 "
2½ "	$\frac{13}{16}$ "	120	6,250	5 "
2¾ "	$\frac{7}{8}$ "	142	7.500	4 " 3 "
3 "	1 "	170	9,000	3 " 6 "

From Catalogue of A. S. Morss, Boston, Mass.

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ON RIGGING

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"Then let his vessel feel the strain
When wars the gale along the main;
Strong in his trust of shroud and stay
The seaman holds his leeward way,
Spreads the reef'd sail on huckling mast
And proudly dares the stormy blast."

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ON RIGGING

WHEN we speak of a vessel's rigging we mean everything that supports the spars and is employed in setting and trimming the sails. Rigging is divided into two classes—standing and running. The first is the portion that remains stationary, and whose office is to hold and strengthen the spars. The second is rove through blocks and moves; its office is to hoist, lower and trim the sails.

Rigging has been much simplified of late years owing to the use of better proportioned fittings and stronger materials. The use of wire rope in place of hemp has reduced the size and weight of standing rigging, and what is of more importance, given a stable factor.

In the old days when hemp was used, the shrouds and stays had to be constantly watched, as they varied in length every time there was a large change in the atmosphere. This was a frequent cause of dismasting. A ves-

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sel before leaving port would have her rigging set up in dry, cold weather; going to sea she would run into a warm region and everything would slack up. As it is now, the expansion and contraction of wire rigging is so small that a few turns of a screw will take it up or give it back. The only danger from wire is in setting it up too taut when at its full stretch, but this, in such length as go to make the shrouds of a yacht, is little to be feared. But the funnel guys of steam-yachts should be frequently looked to, as the expansion of the iron is liable to pull out the deck eye-bolts.

I am not going to tell you how to rig a yacht, because you can learn that better and quicker by doing as the Yankee did who wanted to learn how to make clocks—took one apart and put it together again. Just strip a yacht, then re-rig her, and you will be in a fair way to learn all about it. What I am going to do, is to point out to you a few things in regard to rigging that may aid you in taking better care of what you have, and in making more secure and simple its use.

The one axiom of the business is this, and I want you to engrave it on your memory, for the violation of its truth is the cause of nine out of ten breakdowns: The

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weakest part of any shroud, stay or tackle is its strongest part. If you take two pieces of chain capable of lifting a ton, and join them with a piece of rope capable of lifting five hundred pounds, your combination is only as strong as the rope, and will only lift the smaller weight. This is why shrouds so frequently give way; the wire rope is strong enough, the splice is firm, but the rigging-screw is only capable of bearing half the strain of those parts. Same with halliards; the tackle will lift a ton, the pin in the block or shackle not five hundred pounds. All parts of any tackle must be proportionately strong.

The most unreliable portion of a yacht's rigging is the ironwork. In the first place, much of it is badly proportioned, and in the second place it is too light. There is no sense in making ironwork so light as is frequently done. The amount of weight saved, especially in those parts attached to the hull, is of no importance. Another source of weakness, especially in chain plates, is in making the straps too short; not giving room for the fastenings. Chain plates should be carried right down and be secured to the frame.

The kingpin of the whole structure erected above the deck of a yacht is the bobstay. If that goes you are

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liable to lose everything, and it does go frequently. The principal cause of its parting is the over setting up of the headstays. Sometimes the bobstay itself is set up too taut, at other times the jib stay is strained. One way or another the spring of a spar is brought on it, and the vessel, getting into a head sea, begins to pitch; this causes a back-lashing and away goes a bolt or a plate.

Not long ago we were trying to insure a yacht that was to go South. The underwriters refused the risk on the ground that the yacht would get dismasted, and be obliged to put back or be lost altogether. At the same time they willingly took a risk on two small topsail schooners bound to the West Indies. We all sailed within four days. The yacht went through all right, but both the schooners lost their fore topmasts, bowsprits, jibbooms and other headgear, and had to return to New York for a refit. They ran into a high head sea, and the foremast, being set up on the bowsprit, the bobstay parted under the strain and away everything went.

I have seen a small racing boat with a bronze rod of ⅜ inch diameter for a bobstay, and this secured to the stem with two one-inch screws. You cannot make your bobstay too strong or fasten it too securely. It was formerly

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a custom to fit two bobstays, a regular one and a smaller one, called a preventer. This latter was set up slack of the heavier one. For many reasons this was a poor practice, it being far better to put the strength of the two in one. In another chapter I have told you how to rig a tackle preventer for use when going to sea.

Bowsprit shrouds should be made heavy, and carried as far aft as possible to get a spread. Care should be taken to set them up evenly. Foot ropes under a bowsprit are unsightly, and are not needed unless the spar is long. If your jib stay is carried through the spar and made fast to the stem, it should render freely in the bee hole. Unless it does it is liable to strain the spar. I nearly lost a mast once by the jib stay sawing into the wood and sticking. It parted in a sea-way, and the shock broke the bobstay shackle. Every cruising boat should have two shrouds to a side. On pole-mast boats one of these should run to the hounds and the other to the masthead. Don't set them up to bands; eye-splice and put them over the spar. You never can trust the eye in a band. The rigging screws should be just twice as heavy as what the average man will tell you to use. The screw is the weak part. Cutting the thread destroys the

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strength of the metal. The extra weight is nothing to speak of; the extra strength is everything. Although they are more trouble to care for I prefer lanyards.

Always keep your shrouds set up bar-taut; the old notion that a mast should have play is a fallacy. The stiffer your spar the better it will carry sail. In our modern boats a mast should be kept plumb. From what I have seen all boats sail better with their masts plumb. Another thing, don't cut your sheer-poles too short; they are so cut on half the boats I have seen; the consequence is they are always working loose.

On many yachts the rope used in the running rigging is too small. It may be plenty strong enough, but a man gets tired of picking up and pulling on shoestrings. This is a frequent fault with main-sheets; another is not having enough parts. A sheet tackle should be powerful enough to give one man control of the sail at any time. Weak travelers is another defect. This should be doubly strong, as it is frequently used to tow or make fast to. Every boat should have a strong ringbolt on each side in the quarters for boom lashings, etc.

There are plenty of good blocks and plenty of bad ones. The modern metal blocks are good, but should

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be of a big passage, as the gear when wet is apt to jam in them. This is a fault with all blocks having small sheaves. The weak part of a block is either the pin or the shackle.

On small boats a single topping lift is all that is needed, but on yawls and ketches, where the main boom is inboard and short, two lifts are better. Boats with heavy spars should have a jig fitted to the lift. Lazy jacks are useful on cruising boats, especially if you are sailing short handed, but they are a nuisance when reefing. The ends should be made fast in such a way as to allow of their being slacked up, but not so as to permit of their getting adrift. I have got into trouble several times through the lazy jacks getting adrift. The ends blew across the peak halliards, and fouled them in such way as to prevent the sail from coming down. If this happens at night when reefing you are liable to be in a fix. I may as well say here that the ends of all running gear should be made fast.

If you have a pin-rail this is easily done. Take out the pin and slip the socket though the rope between the strands, shove it on the collar of the projection and put the pin back. If your halliards are belayed to cleats, marl

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them to the cleat. At night or in a blow the crew will let go one halliard to pick up another, and away goes the end flying out. If it is dark it can't be found, as more than likely it is wrapped round a shroud or lift, or is flying out from aloft like a pennant. I have had some anxious times hunting the ends of gear of a dark, windy night. When sailing in the dark or in bad weather make the end of your mainsheet fast; always keep a knot in it. Jib's sheet should be endless, running right round the cockpit. Then you can always find them, and the end won't wash overboard.

It is the custom now to put bridles or spans on gaffs and booms in order to distribute the strain. They are good things if used in moderation, but it is extremely foolish to put a rig of this kind on a twenty-footer carried out in the lavish fashion of a cup defender. I have seen little boats knocking about with spans on the boom that would pretty nearly have held the Columbia's spar. Some of our designers have an especial fad for loading down boats with all kinds of gear, and seem to glory in bridling everything that offers the least excuse for such fittings. The first thing that a good racing man has to do when

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he gets one of these boats is to strip off about half the stuff and change leads all round.

Complicated running rigging is a nuisance; it cannot be too simple so long as it is effective. The less strings you have to pull the quicker you can work. This is just as true on a cruiser as it is on a racer. A lot of line is also a nuisance round the decks; a clear deck is a sailor's blessing.

One of the things I have helped to simplify is the gear on spinnakers. Long ago I pointed out that this sail could be used on small boats without outhauls and lifts, and that without them the sail was easier set and easier taken in. This method of handling that sail has since been practiced on the majority of our racing craft. Half the spinnaker poles are too heavy for their length, and the sails too big to be effective in anything but extremely light weather. All gear belonging to the pole should be snap-hooked, so that it can be attached or detached at once.

Snap-hooks and sister-hooks are excellent contrivances, but beware of them. They have a trick of giving out just at the wrong time, and are to blame for many a

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lost spar. They should be extra large and strong if they are to be subjected to heavy and continued strains.

All gear, especially the iron work, should be constantly examined, not only when at anchor, but while under way. Many men never look at their boat's gear from the time she is put overboard until she is hauled out. Here is a case that fell under my notice: A boat was being stripped for hauling out, when we noticed that her mast was shaky; on examining the step it was found that the heel of the spar was just in it and no more, allowing the mast to play. Taking her under the shears, we raised the spar, and found lying in the step a cold chisel that prevented the heel from dropping home. This boat had been sailed about all summer, and the owner admitted that he noticed something was wrong with the mast, but that he had never examined the step. Another time I was on a cutter that carried away her mast-head. When we examined the break it was found that the stick was competely rotted through. The damage was caused by hollowing of the wood above the upper band, which allowed the rain water to stand and soak into the grain.

If I have a boat in charge I make it a duty to go aloft at least once a week when she is under way and take a

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careful survey of all the ironwork, blocks and splices. I also examine the bowsprit rigging thoroughly. The ironwork should be sounded with a hammer or heavy knife blade, just as railroad men sound carwheels. Blocks should be looked to and kept well oiled. Turnbuckles should also be kept oiled, and if you are out in much rough water they should be covered with a false parceling of painted canvas. If this is done they won't freeze, and when you want to tauten or slack the rigging you will be able to do so without using a lot of kerosene and hard twisting.

On cruising boats with outboard booms reef-pendants for the two lower reefs are generally kept rove, but they are much of a nuisance. This can be obviated in a measure by having them in two lengths, keeping one part in the sail and the other in the locker when not in use. If the sail is heavy a small tackle is handy. Such a tackle should be carried on all boats; it saves a lot of hard labor, especially if you take ground and have to haul off.

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AUXILIARY CRUISER FOR SOUTHERN WATERS

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ON STRANDING

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Borne o'er a latent reef the hull impends,
And thundering on a marble crag descends;
Her ponderous bulk the dire concussion feels,
And o'er upheaving surges wounded reels—
Again she plunges! hark! a second shock
Bilges the splitting vessel on the rock.

—FALCONER

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ON STRANDING

THIS is a subject upon which I can pose as a master. If any man has been ashore more times than I have, I should like to meet him and spend an evening comparing notes. One of my favorite amusements is to sail into places where a man of sense has no business to go; consequently my boat is continually being hung up on rocks, shoals and bars. While this is not particularly good for the boat, it has done me no harm, as I have gathered a lot of knowledge and experience which, you willing, I will spread before you.

Yachts, unlike merchant vessels, are seldom damaged by taking ground. This is because, in proportion to their weight, they are extremely strong fabrics. A merchant vessel when loaded has little reserve buoyancy, and when she strikes, she hits hard; but a yacht is almost as buoyant as an empty barrel, and unless she hits with a perpendicular portion, does so very lightly.

Frequently when a yacht hits a rock it seems to those

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on board as if the end of things had come; but when an examination is made it will be found that little harm has been done.

I once struck a rock with a small sloop. It was blowing a strong breeze and considerable sea running. When she struck, the blow was terrific; it threw me over the wheel to land on my head in the fore end of the cockpit, and knocked the rest off their pins. The centerboard was driven clear up out of the case against the cabin roof, the sloop making a jump over the stone and into deep water on the other side.

We all thought the boat must be badly damaged, but as she made no water, we turned round and worked her home. When she was hauled out, the only sign of the blow was a dent in the lead keel just deep and wide enough to hold a finger.

Another time I was in a bulb-fin boat, racing, when she struck a rock. She was close-hauled and going like a scared cat. It felt like banging up against a stone wall, the shock sending us all flying forward. The damage done amounted to a bruised bulb and a slightly bent fin; the hull was, so far as we could ascertain by superficial inspection, unhurt.

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Metal-shod keels are undoubtedly a great protection, and a yacht that strikes fairly on her iron or lead will seldom be damaged to such an extent as to endanger her safety. I have known boats to be sunk by striking rocks, but they hit either the side of the bow or the bilge and stove in the plank. For this reason, if you find yourself going on a rock, always take it stem-to. By this means I jumped a rock in Wood's Hole that was six inches out of water, and landed all right on the other side.

The most dangerous thing to do, yet the thing that is most natural to do, is to put the helm up or down with the hopes of escaping; consequently your craft is carried on, and strikes broadside. This not only is liable to bilge her, but makes it far more difficult to get her off. It is especially dangerous if you go on with a weather wind or tide.

Always remember that wounds in a hull are least dangerous at the ends, and most dangerous in the middle body. If a boat is pierced in her head or tail you may be able to trim the leak out, or save her from sinking by stranding and jacking the leaky end up, but if she is pierced amidships you cannot get at the hole unless you haul completely out. I remember seeing a sand-

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bagger that had torn the plank away from her stem saved from sinking by trimming, the crew raising her head by piling all the bags aft.

Luckily for the navigator, the sea by constant washing, and nature by a covering of seaweed and slime, prepares the majority of rocks for his reception, so that if he strike the object fairly with sufficient way on, his craft will slide over. But sometimes he runs against a ragged reef, and then there is trouble. The reefs and lone rocks along our coast are generally worn smooth, and are not dangerous customers like the coral formations of warmer climes. One of the worst things to run on is a reef of small boulders, as you are liable to get one on either side just under the bilge. These places are the remains of a point or island, and are good places to fight shy of. The worst boats to take ground are flat-bottomed craft like sharpies; when they go on they generally make a perfect job of it. They are bad things to strand on a sand-bar or flat, the bottom of the boat sucking like a leech to a turtle's hindquarter. Unless you can get the tide to lift one of this kind off, it is either jettison the ballast or dig out. A man who knocks about a sandy land in a sharpie should always carry a shovel with him.

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The first rule of action upon stranding is to at once lower all sail. There is but one exception to this; I will state it later. You cannot drive a vessel off ground with her sails (you may back her off); at least I never could. The reason of this is that a boat under sail pressure drives down, and draws more water the harder you force her. Again, if you drive her off, or over bottom, with the sails, you are likely to damage the hull or break the rudder.

After taking off sail run out a kedge against the wind or current, unless both are ahead; then take it out the way you came in. Give it all the line you can; the straighter the pull the less likely that your anchor will come home. As soon as it is down, heave taut, and keep the vessel's stern to the sea, current or wind, whichever is most powerful. This done, if on a rock, go below and see if she is making water. While you are doing this let the other hands sound round the craft to find how she lies.

If she is not leaking, get all your beef on the hawser and heave away. Here is where a handy-billy or watch-tackle comes in. Sometimes you can use the windlass, but this is not as good as a tackle, because the hands

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have to stand forward to work it, and you want all the weight aft. If she refuses to budge under the pull, go below, and if you have inside weight shift it aft. If she still refuses to start, get out everything weighty, and either lighter it or heave it over-side.

Sometimes you can start a boat off a rock by broadening off the main-boom, and sending a man out on it to roll her. Before you do this be sure and set up the topping lift, and weather preventer if one is fitted. The principal thing is to keep a constant and firm strain on the hawser.

If there is any roll on, get the hawser set up fiddle-string taut with the tackle, then place all hands so as to surge it sideways every time she lifts on the sea. If the boat is one with a deep false keel you can gain a few inches off the draught by careening her. This is done by taking an anchor off at right angles to her lay and setting up the hawser by any of the mast-head tackles, either jib or peak halyards. Never do this if there is any sea on, as it is liable to strain the hull or break the false keel. I don't believe it is much good, and do not recommend its practice except as a last call.

Another plan which I found to work well when a boat

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is stranded on a shelving bank of either mud or sand is to overhaul the throat halyards, and bend the gaff-block to a bight in the hawser, letting a tail of the hawser drop down from the block. Then set up hard on the halyard, using the windlass or watch-tackle. This done, let a man hang on the tail of the hawser, throwing his weight up and down so as to surge it, the rest taking in the slack. This makes the mast a lever to lift her, and if there is water under the stern she will surely start.

In a boat with a deep sternpost and sloping keel you can sometimes do better by swinging it on its heel, and heaving off bow first, getting all your spare live weight out on the bowsprit to bring her by the head; but it depends on where she is hardest fast, and how much weight you have to trim with. If she is fast aft of midships this plan will work, but if forward of that point it will not.

The most frequent strandings are when trying to enter the mouths of creeks or rivers; places beset with bars and flats. If the wind and tide are ahead you can easily get off, but if either is astern you are liable to be in a fix. If you strike carrying the tide and wind with you, down all sail instantly, lash the helm amidships, and get out the anchor and long warp.

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The minute a vessel strikes under these conditions she will swing broadside-to, and drive up higher, at the same time the tide will pile the sand or silt round her. If you can hold her stern to the tide, the current will cut the sand away, and the swell will help you to pull her off.

Now comes the only exception to the rule of taking in sail: If you are going into an inlet with a fair wind and head-tide, and take ground on a soft bar, keep your sails full and hold the boat's nose to the current. If you can keep her steady, which you can best do by getting all your spare life weight forward, the current will cut a passage for you. The most dangerous stranding is with a strong in-running tide and a stern swell. A boat under these conditions is liable to be hove over on her side and flooded. A small steamship was lost last winter in the Bristol Channel by an accident of this kind; she struck on a shoal, swung beam to the tide, and rolled completely over.

Several power boats have been wrecked in the same manner, as from the narrowness of their beam they are very liable to roll over when caught broadside-to by a current. Another thing that often damages launches is leaving them where, when the tide falls, they are broad-

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side on a shelving bank. The water leaves them and they fall over; the tide returns, and not having sufficient buoyancy to lift before it rises to their coamings they are flooded and sunk.

Years ago, when I was a lad, a very fast and narrow steam launch was left by her crew on a shelving bank close to where we were anchored. When the tide dropped she fell over, and as her crew did not return we tried to save her, but the bottom was too soft to allow working on, and she filled at the flood. On the next ebb we bailed her out, and with a little engineering and a lot of labor got her righted up.

We took two big joists and lashed them across the boat, but so poorly fitted was she with cleats and other things to make fast to that we had to bore holes in the deck to pass the lashing and secure them to the frame. The ends of the joists stuck out about fifteen feet on the high side. Under these ends we laid another timber, parallel to the boat's length, in the mud and ballasted it with stones and iron. To this timber we lashed two tackles, one from each joist. Then as the tide made we hove slowly down on them, and she righted up.

If the bottom had been hard we could have parbuckled

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her, but it was impossible to do it in the deep, soft mud. This boat had a high and heavy boiler, which made the work harder, as it levered her down.

If you can float another boat alongside of a launch in this fix you can lift her by parbuckling, or you can do it from a dock if the wall is high and near enough. To do this, take a stout line, made fast, from the near side over the deck and right under the keel; then lay your floating boat alongside as close as possible, and bend this line to the latter's throat halyards. Heave taut on it and belay.

If possible get two lines, one forward and one aft, having separate tackles. As the tide makes keep heaving in the slack, letting your floating boat draw in sideways to the launch. This strain will aid the water in lifting, as the launch will have to rise with the floating boat. If the launch is very heavy or of scant beam, like the steam craft I mentioned, you had better use joists or spars to help the leverage.

I once took a launch off a rock by this same plan, when hours of heaving on hawsers had failed to move her. Another plan is to lift a boat by lashing empty barrels to the side by passing slings under the keel. If the boat is neaped so that sufficient tide cannot be got

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to lift her, you can fill and sink the barrels, bunghole up; then shorten up the slings and pump the barrels out with a hand-pump. This barrel trick is only performed when a boat is bilged and full of water.

Let me say here that all small power boats that cruise in strange waters where the bottom is hard should carry either a screw or hydraulic jack, and a good stout piece of square timber. If you get aground in places where there is little or no rise of the tide you have something to start in the wrecking business with. A jack and timber are also useful if anything happens to the wheel and you want to get the stern raised.

To show the danger of forcing a boat off a rock let me cite one instance: A 50-foot sloop of the old flat-floored centerboard model struck on a stone when going free with a moderate wind. The sailing master kept his sails up, and with this pressure and a warp dragged her over and off the rock bow first. She had no sooner gone clear than she filled and sank.

When floated and docked it was found that she had a hole in her bilge big enough for a dog to crawl through. The first blow had started a butt; this caught, and in dragging over the plank was bent back and ripped away

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from the frames. Had he taken in sail, and pulled her off stern first, she would have floated long enough to have got into harbor.

Having considered accidental stranding, let us now consider voluntary stranding—that is, the running of a vessel ashore to save the vessel or the life of her crew. Let us suppose that you are caught on a lee shore, and for some reason cannot claw off. You are bound to go ashore anyhow, and in order to give the boat and people a chance decide to run in and strand her.

If the shore under your lee is rock I can do nothing for you. Your only chance is to pick out an opening or cleft and drive her in, and the minute she strikes jump for hard land. Such places are usually to be found on the rocky shores of our coast, but if the land is steep-to and sheer-faced, there is little hope for the boat or her people.

There are two kinds of sandy shores on which you may have to strand your vessel—the gradual slope and the steep slope. The former is by far the more dangerous, as the broken water extends some distance from the beach.

In running in breaking water—in fact, in running in

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all heavy seas—the rule for safety is this: Let the wave-crest pass you, not carry you. If you can hold the boat back, so that the wave-crest will split at her stern and rush by on each side, the boat will travel in safety. This is why it is dangerous in heavy water to carry sail when running. Many men do it for fear of pooping, but there is far less danger of pooping than there is tripping or being brought by-the-lee. Fore-and-aft canvas, particularly sails laced to booms, are bad things to run under; anything in the shape of a square sail is much better. Hundreds of vessels have been lost by running under a press of sail—probably ten times as many as have been destroyed by pooping.

Now if you are obliged to strand on a flat beach, keep your vessel's stern to the swell and moving as slowly as possible. The best thing to do is to tow a hawser astern, or a small sail. This will check her way, and also prevent the sea swinging her stern round. Watch her closely as the sea strikes under the stern, and check the desire to broach with the helm. She can also be aided by having hands on a small jib or staysail sheet, and backing this sail either on one side or the other, as the threatened sheer requires. Get your weights out of the bow and

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keep her trimmed a bit by the stern. The idea is to have her strike bottom on her whole keel-length, and not on the forefoot.

Here is where the luck comes in. If she strikes with her heel first and her head raised on a sea, you will probably land well up on the beach, but if she strikes with her forefoot first and her stern up in the air you will land—well, only good fortune can save you.

I have seen fishing boats beached in this way in heavy surf, the crews dropping an anchor and checking the craft until the right moment, and then slacking away smartly. In this way they rode the boat in on the back of successive seas. With sharp-stern craft this can be done with safety, but I would not care to try it with a square stern or long after-overhang craft.

I would advise the young seaman to take a small skiff or dingey to a beach where there is a small sea breaking and practice making-off and landing through the surf. He had better dress in a bathing suit, and try the game when the water is warm. In a day or two of this work you will learn more than I could teach you in seventy volumes.

If the beach is steep-to, the sea breaking but a few rods

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from the strand, you can stand in under good way, keeping her end-on until close to. The instant you feel that she is going to strike put your helm over and bring her almost broadside to the sea. The wave rising under her weather bilge will throw her sideways on the beach, and each succeeding sea will drive her higher up.

In running at any time in heavy water use oil, letting it drip from either bow. With a good thick slick in your wake you will be less likely to be washed by the crests.

But better than all these directions is the advice to keep off rocks, shoals and shores. Don't go into places unknown to you unless you have a good chart or your lead going; especially keep away from dangerous places when the wind is brisk, the sea heavy or the tide strong. An ounce of precaution in this matter is worth tons of cure.

Nine out of ten strandings or strikings are the result of carelessness or recklessness. The only thing a man is justified in hitting is a wreck or a lone rock; these things the lead will not announce, and they are frequently uncharted. Old familiar "didn't know it was there," should more properly be "didn't know I was there." Rocks don't move, but you would think they did to hear many

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yachters explaining how it happened. I have hit a good many rocks in my day, but don't believe I could prove an alibi except in one case, when the boat ran on a stone that nobody had ever heard of before. We examined the stranger and found it was a rock sure enough, but where it came from or how it got there no man knew, but all hands stood ready to swear that they had sailed over the exact spot many times and never touched anything.

I don't doubt but what there are thousands of uncharted rocks over which and alongside of which vessels constantly pass but do not happen to strike. Like the celebrated Daedalus Rock, they may lurk for years in the course of commerce, until the unfortunate boat comes sailing along that is destined to win immortality by striking and unmasking the danger. But it is not worth while to worry over these vigias while there are plenty of well-known dangers to keep the navigator busy. So proceed fearlessly but cautiously, trusting in your lead and chart, and hug and play with weather shores as much as you please, but give the lee ones a wide berth.

Before entering an inlet, creek or river month, if you are not familiar with it, lay-off or anchor outside. Send in the dingey with a lead or pole, and sound for the deep-

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est place on the bar; when this is found, let the dingey lie there or on a line inside of it to guide you in. You may lose a few minutes by so doing, but by the delay may save yourself hours of hard labor and anxiety.

Never try to run inlets when a heavy swell is on; the open sea is far more merciful than a bar at such times. It is especially dangerous to attempt such places in small power boats.

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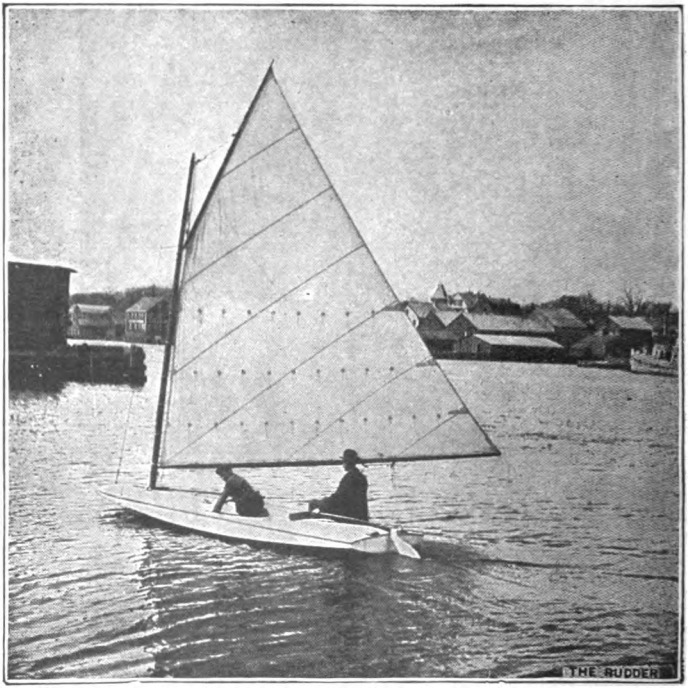

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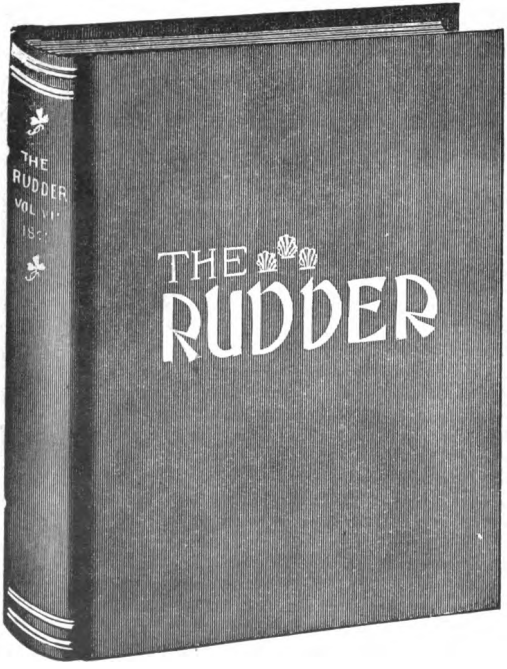

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